Airlines Find Ways to Beat the Holiday Rush

By John Gallant
CW Staff

While other shops bend under year-end pressures, DP departments in the airline industry are using capacity planning and programming moratoriums to ease system strains brought on by increased holiday travel.

"We hit peak usage of the system from mid-November until after New Year's Day. But when we do our capacity planning earlier in the year, we base our requirements on getting through that Christmas rush," explained Wayne Condra, director of computer services for Delta Air Lines. "We try to have all our critical-path processing systems in place for this time of year."

Within the peak holiday period are so-called "spike" days, such as the Monday after Thanksgiving, when the number of updates, inquiries, inputs and other processing transactions is exceptionally high, said Fred Voth, manager of computer performance for Republic Airlines. "During this season and especially on spike days, we have to handle an increased amount of data access. But I can't recall having to add extra processing power or communications lines, because our capacity planning has been so good." Added William Lakeman, manager of applications programming at Eastern Airlines' Miami Computer Center, "We've worked all year to provide the capacity for this season."

Capacity planning for some air carriers involves sophisticated techniques. At American Airlines, DP management utilizes detailed fore-

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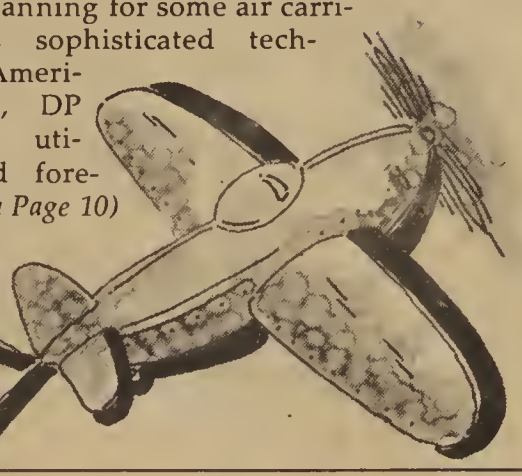

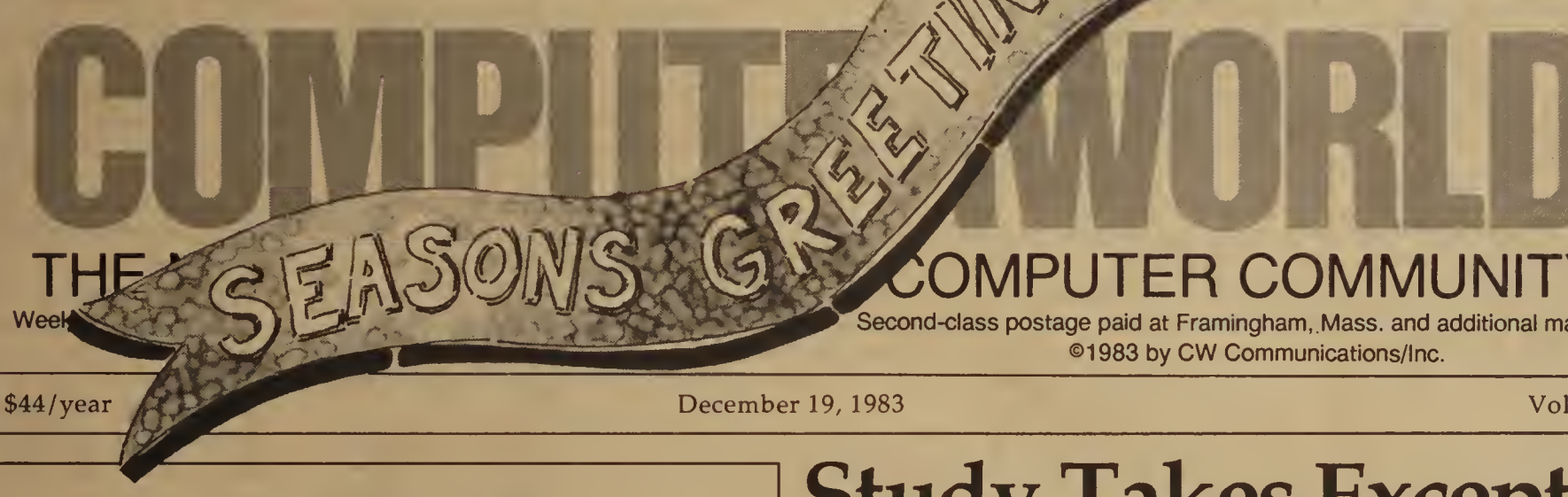

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See You in '84

Next week's *Computerworld* will feature our annual look at the year ahead and the developing trends in the computer industry. Combining the issue dates of Dec. 26 and Jan. 2, "Forecast '84" will examine what corporations are budgeting for management information systems and services next year, take a fresh look at micro-to-mainframe links, examine what IBM has done in the first years of the '80s, discuss how Digital Equipment Corp. is going back to the basics and check out what's hot and what's not.

Computerworld will sport a fresh look when we resume normal weekly production on Jan. 9. That issue will contain all the news and features offered in every issue of *Computerworld*, but it will feature an updated format with an easy-to-read typeface, more indexes and expanded technical sections.

The Jan. 9 issue will also witness the debut of a new technical section called "Microcomputers." The new section — covering systems, software, storage, output devices, board-level devices and auxiliary equipment — will centralize in one place the expanding number of stories now found in *Computerworld* on the use of microcomputers within corporations.

Study Takes Exception To Belief That Firms Don't Control Micros

By Jim Bartimo
CW Staff

NEW YORK — Despite the popular belief that the growth of microcomputer usage within corporations has been chaotic and uncontrolled, most of corporate America is dealing with the microcomputer explosion through the use of micro-to-mainframe links and companywide guidelines.

That is the conclusion of a report commissioned by the National Association of Accountants and released at a press briefing here last week.

Conducted by Price Waterhouse & Co., "Managing Microcomputers: A Guide for Financial Policymakers" looks at 240 individuals in 100 companies of varying sizes and locations involved in retailing, manufacturing and service. Within these companies, three groups were surveyed — chief accounting officers, management information systems managers and internal auditors.

"We may have underestimated the ability of corporate America to handle this phenomenon," said Price Waterhouse partner Gerald Ward. "There has been a lot of gloom and doom."

Fifty-nine percent of the 100 companies indicated that their micros are communicating with other computers. Of that group, 71% said the micros communicate with a mainframe or minicomputer inside the company with varying degrees of access to corporate data bases. Another 52% of the companies with communicating micros claimed they use electronic mail, while 14% said they share peripheral equipment, inferring a growing spread of local-area networks.

Another surprise found in the study results was that corporations are controlling the spread and use of microcomputers — something that has not been the case in recent years. A whopping 81% of the 100 companies claimed to have a formal policy regarding the purchase of microcom-

(Continued on Page 6)

Amdahl Plans Alternative To IBM's MVS

By Paul Gillin
CW Staff

SUNNYVALE, Calif. — Amdahl Corp. will release an "alternative" operating system to IBM's MVS for IBM and Amdahl mainframes which Amdahl said will provide improved performance for high-volume transactions while occupying significantly less memory than MVS.

The operating system, which is code-named Project Aspen, is slated for release in late 1984 or early 1985. The system will coexist and communicate with MVS but will be geared toward separate applications involving high-volume transactions and program development.

"It is not a replacement for MVS," a vendor spokesman said.

The system can also run as the sole operating system on a CPU. However, the spokesman would not say

(Continued on Page 8)

Inside

"Can we talk?" both Digital Equipment Corp. and Dun & Bradstreet asked last week. **Page 2.**

• • •

The night before Christmas is less than a week away, and several vendors have already stuffed their systems stockings. Modular Computer Systems, Inc. plunged into the 32-bit systems market by introducing its first superminicomputer **(Page 4)**, Sperry Corp. added two more multiprocessors to its 1100/70 mainframe line **(Page 5)** and Burroughs Corp. unwrapped an entry-level desktop system that can communicate with its larger systems **(Page 6)**.

• • •

A license to steal is what computer matching and profiling may be giving "professional" criminals, two MIT researchers warn. **Page 6.**

• • •

AT&T Renames, Restructures Western Electric

By Phil Hirsch
CW Washington Bureau

Western Electric will be dissolved as a separate corporate entity and absorbed into the newly formed AT&T Technologies, Inc. as of Jan. 1.

The new corporation will be structured internally into four lines of business on that date. Each line of business will be headed by a marketing executive who controls manufacturing and product development. The main aim of the new organization is to make it more responsive to customer needs.

AT&T Technologies, Inc. will be one of three incorporated units operating under the umbrella of AT&T Technologies and will be headed by James E. Olson. The other two units are Bell Laboratories and AT&T Information Systems. Olson, the new chairman of AT&T Technologies, Inc., will also continue as vice-chairman of AT&T.

The heads of each of the three

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Voice Tech Makes Itself Heard

• *DEC Adds Voice Synthesizer*

By David Myers
CW New York Bureau

NEW YORK — It seemed only appropriate that Digital Equipment Corp. permitted its talking computer to introduce itself to reporters and analysts here last week.

The industry's second-largest computer maker unveiled a $4,000 voice-synthesis unit called Dectalk that DEC executives said can "read" text strings at 120 to 350 word/min in any of several different voices.

Available in large quantities in March, the device provides single-user remote access to a computer via telephone. User instructions are provided to Dectalk and the host computer by pressing numbers on a standard Touch-Tone telephone. The unit can acknowledge these instructions in one of several user-selected voices — ranging from a deep baritone to one with a feminine lilt — and provides the requested data over the telephone also via an electronically synthesized voice.

Dectalk was demonstrated here last week running on the desktop Decmate microcomputer. However, the voice unit is compatible with any type of computer from any vendor, said Julius Marcus, vice-president of business and office systems engineering. He added, however, that rigging up a compatible device would require software not covered by the unit's $4,000 price.

Two years in development, the voice unit acts almost solely as an output device. "It will output any text string — the same thing you output to a printer," explained Robert Hughes, group manager of business and office products marketing for the firm. As an input device, it is "limited to whatever a Touch-Tone dial can do."

DEC presently has no plans to expand the voice-synthesis unit into a multiuser device. Moreover, initial users will be required to write their own applications programs.

DEC readily admits there is presently no real application or target market for the voice-synthesis device. In fact, DEC is depending on end users to come up with applications for Dectalk. "We have to build a market for it. The market hasn't happened yet," said Bill Avery, terminals and workstations engineering manager for DEC.

Decmate, VAX Enhancements

DEC also used last week's press conference to unveil a number of software enhancements for its Decmate workstation. These include Decspell, a spelling correction program that costs $395; an enhanced word processing package for $995; and a graphics software option that costs $695. The graphics option will be available sometime within the next few months, while the other two packages will be shipped sometime in the spring.

DEC also brought out document preparation and document transfer programs for its high-end VAX superminicomputers, including a document output and preparation package for $7,000 and a document exchange communications package, called DECDX, costing $2,850. The former will be available this spring, the latter sometime this winter.

Finally, the company announced two new communications capabilities for its VAX machines: bisynchronous terminal support for linking IBM 3270 terminals to its VAX systems, selling for $3,000, and an external document exchange program, costing $5,000, for transfers between VAX and Wang Laboratories, Inc.'s Office Information Systems. These will be available this winter and in the spring of 1984, respectively.

DEC is headquartered in Maynard, Mass. 01754.

• *Credit Data Now Available Via Dunsvoice*

By Jim Bartimo
CW Staff

NEW YORK — Dun & Bradstreet Corp. has announced the implementation of voice technology in its information services. The computer-voice network, called Dunsvoice, will give Dun & Bradstreet Credit Services' customers local telephone access to information on about 5.3 million U.S. businesses.

The voice network will allow 60,000 customers in 79 cities nationwide to obtain business and credit information via a push-button telephone. A computer-directed voice responds to the customer, who then requests various data by pressing the buttons on his telephone.

Information available includes a summary index of payment habits and a business summary that includes sales, net worth, number of employees, condition and trend of the business, name of principal officer and year the business started, a Dun & Bradstreet spokesman said.

Included in the Dunsvoice service will be the ability to request hard-copy documents to be mailed out. Special or more detailed information can be requested by having the voice network transfer the user to a customer service representative.

The network cost several million dollars to develop over three years. It has been tested by 400 companies over a six-month period, a company spokesman said.

The initial cost of obtaining access to Dunsvoice is $1,760 for 100 units. A basic credit rating of a company will use a half unit, and the payment index for company and industry will use a quarter unit. Dun & Bradstreet is at 299 Park Ave., New York, N.Y. 10171.

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MAX IV Superset Also Announced

Supermini Marks Modcomp Reawakening

By Tom Henkel
CW Staff

FORT LAUDERDALE, Fla. — After two years of virtual dormancy, Modular Computer Systems, Inc. has, in the words of its president, "come out of the closet" with its first 32-bit superminicomputer.

Called the Classic 32/85, the unit is a real-time processor that can run both 32-bit and 16-bit applications, the latter reportedly without software modification or system degradation. Like other systems in the firm's line, the newest entry is designed principally for factory automation and scientific applications, a spokesman said.

In addition, the firm also announced MAX 32 Rev.A, a superset of the firm's 16-bit MAX IV operating system designed to support real-time processing for the 32/85. The 32-bit system can also operate under MAX IV, a spokesman claimed.

The Classic 32/85 boasts both 16- and 32-bit firmware instruction sets, which are said to allow users of the firm's 16-bit minicomputers to run their software on the 32-bit machine without modification. Current 16-bit program users do not have to recompile their applications to run them on the supermini; however, since recompilation offers the benefit of a larger address space, it can result in improved execution time, according to the firm's president and chief executive officer, Gabriel A. Rosca.

Due to architectural improvements, the Classic 32/85 reportedly offers twice the performance of the firm's high-end 16-bit processor, the Classic II/75, announced in 1982. The 32/85 is also compatible with Modcomp's line of board-level processors announced earlier this year: the Classic II/15 Modacs V, an intelligent process I/O system; the Modacs II, a data acquisition and control system; and the Model 4185-X disk subsystem [CW, Aug. 29].

Memory Modifications

The Classic 32/85 offers up to 64M bytes of multiported physical memory and 1G byte virtual memory. However, operating system modifications to accommodate virtual memory will not be made for at least a year, according to Prem Chawla, director of product marketing.

The system's CPU is composed of the memory management unit with a mapping processor, a four-way 64K-byte cache memory and an instruction set processor.

The Classic 32/85 can be configured with up to six central processors or I/O control units. A single-processor configuration offers an internal throughput roughly equivalent to two million instructions per second (Mips), while a four-processor configuration offers throughput roughly equivalent to 8 Mips, the vendor said.

Typically, a maximum of four central processors can be configured with up to two I/O control units. But for I/O-intensive applications, reportedly up to four I/O control units can be attached to two CPUs, the firm said.

All application software written on any Classic series processor can be transported to the 32/85 processor operating under MAX 32. In addition, the 32/85 uses the same I/O bus as the earlier 16-bit Classic systems; therefore, peripherals used on earlier systems can also function on the Classic 32/85, the vendor said.

A basic 32/85 configuration including a CPU, two I/O controllers, 2M bytes of main memory, the maintenance subsystem and console controller costs $148,500. Additional memory costs $12,000 in 2M-byte additions. A similarly configured processor with two CPUs, two I/O controllers and 6M bytes of main memory costs $295,000. The MAX 32 operating system can be licensed for $10,000, the vendor said.

Modcomp can be reached through P.O. Box 6099, 1650 W. McNab Road, Fort Lauderdale, Fla. 33310.

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The redesign, *Computerworld's* first in seven years, is being carried out under the direction of Robert Lockwood, the nationally known newspaper designer whose credits include *The Christian Science Monitor, Chicago Sun Times, Allentown Morning Call, Philadelphia Bulletin, Dallas Morning News* and *Baltimore Sun*. He was the founder and first president of the Society of Newspaper Designers.

Market May Still Give A Tough Time to Modcomp

Analysis

By Bill Laberis
CW Staff

FORT LAUDERDALE, Fla. — The price and performance claims of Modular Computer Systems, Inc.'s new 32-bit supermini appear to make it an attractive factory floor addition, but other market forces will make it difficult for the company to regain its failing financial health.

For one thing, 32-bit capabilities ceased being a novelty years ago, and users now expect them. Thus, with its late entry into this market segment (see related story), Modcomp joins such major factory automation vendors as Digital Equipment Corp., Perkin-Elmer Corp. and Gould, Inc. that have offered 32-bit processors for factory automation for some time.

Also, Modcomp officials who were presenting the 32-bit Classic 32/85 last week may be overstating the vitality of factory automation demand in 1984. Modcomp is counting on a "major surge" in factory automation-related purchases in 1984 as the recovery spreads to the manufacturing sector of the economy. With this surge, Modcomp would like to add upward of 30 major accounts to its books in the year and is staffing up on the marketing side to do so, the company said.

Gradual Climb

However, instead of a surge in demand, what may be more likely is a gradual climb, mainly because factory automation is a relatively new concept, encompassing elements of both process control and traditional data processing. Getting professionals from both spheres to work together and to agree on anything will be a difficult task.

"I see a lot of pent-up demand in the factory automation area, but companies are still wrestling to define just what it is, let alone how much they are willing to risk on it," said Tony Friscia, who tracks factory automation for Framingham, Mass.-based International Data Corp. "Factory automation has a really great future, but it isn't going to happen all at once, or even a great deal in one year."

It is that bright future that has attracted major competitors to the factory arena, and it is this increased competition coupled with Modcomp's outdated 16-bit line that has made life so difficult for the company recently.

After earning $1.8 million on modest sales gains in 1982, Modcomp went into a tailspin, with the company posting losses of $1.4 million, $550,000 and $10.9 million in the first three quarters of 1983, respectively. Heavy losses are anticipated in the fourth quarter, while revenues for the year may end up at 1981 levels. Meanwhile, the company has axed 14% of its work force — mostly white-collar professionals [CW, Oct. 10] — in an effort to stem the flow of red ink.

"With the kind of competition out there, it is just not a comfortable market to be involved in now," Friscia said. "Modcomp has a solid product line, and the new machine looks like a good one. But it's tough to go against the likes of DEC in one of its stronger markets."

Friscia said third-party software companies are more inclined to write applications to run on machines of the bigger vendors, which also have the largest installed bases.

Modcomp claimed it has an installed base of more than 3,000 16-bit machines, and it is this market that is its primary target with the 32/85. One key feature of the 32/85, Modcomp said, is its ability to recompile applications written for 16-bit machines and run them in the 32-bit mode with no degradation, a feature it claimed to be unique in the real-time processing world.

But this feature may not have much applicability beyond Modcomp's own user base, Friscia commented.

Sperry Adds Two Processors to 1100/70 Series

By Tom Henkel
CW Staff

BLUE BELL, Pa. — Sperry Corp. has added two high-end multiprocessor computer systems to its 1100/70 series of mainframes.

Called the 1100/73 and 1100/74, the units offer users the additional choices of a three- and four-CPU system, respectively. The enhancements bring to 19 the number of available uniprocessor, dual-processor and multiprocessor configurations in the 1100/70 line.

The 1100/73 and 1100/74 use the same 64-bit chip technology used in other 1100/70 series processors. In addition, the newly announced processors are compatible with other processors in the line.

All main memory for the 1100/73 and 1100/74 is contained in external storage cabinets. On previous 1100/70 mainframe systems, all memory is internal, with additional external memory optionally available.

The maximum main memory of the 1100/73 and 1100/74 is 8M words, or 32M bytes, with each external main storage unit containing a memory capacity from 1M to 4M words (4M to 16M bytes), the vendor said. Both the 1100/73 and 1100/74 use the 1100/OS operating system, which is compatible with other processors in the 1100 line. Components of the 1100/OS include system control software, Sperry's Mapper applications development package and most popular languages, a spokesman said.

The 1100/70 configurations include a Distributed Communications Processor (DCP): either the firm's DCP 40 (which supports up to 256 communications lines), the DCP 20 (which supports up to 48 lines) or the DCP 10 (which supports six lines). In addition, the DCP units offer network processing, including downline nodal processing and data concentration, the spokesman noted.

The 1100/73 and 1100/74 incorporate a disk controller that allows attachment of up to 16 Sperry 8470 and 8450 disk drives on a single or dual channel. The controller also allows attachment of up to four 8480 disk drives that can be intermixed with the 8470s or 8450s, the vendor said.

An 1100/73 CPU with 1M word of main memory costs $1,052,710. The unit leases for $26,625/mo on a five-year plan with a monthly maintenance fee of $6,450. The 1100/74 central processor with 1M word of main memory costs $1,322,180. The unit leases for $33,635/mo with a monthly $8,360 maintenance fee, according to the company.

Both systems are available immediately from Sperry through P.O. Box 500, Blue Bell, Pa. 19424.

DEC Gear Bound For Soviet Bloc Seized in UK

By Peter Bartolik
CW Staff

DORSET, England — Yet another consignment of Digital Equipment Corp. computer components has been seized just prior to alleged shipment to a Soviet bloc country.

Agents of the UK's Customs and Excise seized Dec. 11 a container truck loaded with six "pieces" of DEC equipment, reportedly valued at more than $750,000, as it was about to be placed on a ferry here in the port of Poole.

According to U.S. Customs spokeswoman Christine Frazer, "neither the U.S. manufacturer, Digital Equipment Corp., nor the UK firm [that imported the equipment into the UK] are involved in this."

Arrested when agents seized the equipment were Bryan Williamson, 51, president of the UK firm Datalac, and Christopher Carrigan, 40, an engineer with the company. An unnamed person who was driving the container truck was also detained. Williamson and Carrigan were reportedly arraigned Dec. 12 before a UK Magistrates Court on charges that they violated the 1981 British Export of Goods Control Order. They were reported held in lieu of bail.

Exactly what type of DEC equipment was uncovered in the seizure was not publicly identified. Customs' Frazer said she did not know whether the equipment was the same type that was reported seized recently in West Germany [CW, Nov. 21] and Sweden [CW, Nov. 28]. Those seizures involved a split shipment of a DEC VAX-11/782 dual-processor superminicomputer.

According to Frazer, Williamson "is the subject of a current U.S. Customs investigation, and the firm is on the U.S. Department of Commerce's denial list." The denial list contains the identities of individuals and companies who may not be granted export licenses for U.S. high-technology items.

The equipment was reportedly to be shipped to France, but allegedly would have been reshipped to Czechoslovakia. According to Frazer, Williamson had received British export licenses for two computers, but not for four additional components that were seized.

The U.S. Customs attache with the U.S. Embassy in London was involved in the investigation conducted by the UK's Customs and Excise department, Frazer said.

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Matching Assailed as Way to Catch Criminals

By Jake Kirchner
CW Washington Bureau

CAMBRIDGE, Mass. — Using computer matching and profiling to detect white-collar crimes — a method popular among bureaucratic and law enforcement agencies — may actually catch only less sophisticated violators while giving "professional" criminals "a license to steal," according to two MIT researchers.

Relying on computers to scan data files routinely or to build statistical profiles of criminals — both intended to alert authorities to possible indicators of criminal behavior — necessarily results in focusing on a limited number of variables, noted Dr. Gary T. Marx and Dr. Nancy Reichman in a soon-to-be-published paper on the subject.

Marx, a professor in the MIT Department of Urban Studies and Planning, and Reichman, recently awarded a doctorate by the same department, suggested that these indicators, although narrowly selected, "may be invested with far more predictive power than they warrant." This might detract attention from other variables and other types of crime they might indicate.

While these techniques can deter or discover some offenders, they also offer "almost guaranteed" success for criminals "who gain knowledge of the system and take action to neutralize it."

Their paper, which will appear in an upcoming issue of *American Behavioral Scientist*, concludes: "Cleary not all potential offenders can acquire the knowledge or have the skill sufficient to neutralize the system. However, over time, it seems likely that these systems will disproportionately net the marginal, amateur, occasional or opportunistic violator rather than those who are more systematic, repetitive, skilled or professional in their rules breaking."

Ironically, the paper added, those skilled persons "may be granted a kind of license to steal, even while headlines hail the effectiveness of control agents using new techniques."

According to Reichman, the paper is the first fruit of a larger research project examining the use of computers to ferret out white-collar crime. She told *Computerworld* that on the subject of computer matching and profiling, "our concern is that these techniques have been expanding with little empirical documentation on their costs, benefits or consequences."

The paper is meant to raise issues and does not come to any hard conclusions on this use of computers, she said, adding those conclusions cannot be reached until better case history and statistical data are available. Collecting that data may be the next step of their research, she said.

In their paper, the two researchers noted that use of computer matching is on the rise, with approximately 500 programs now in effect on the state and federal level. While the programs have successfully detected some crimes, they said, they also raise questions about errors and civil liberties violations.

Data errors, software errors and mistaken interpretation of the data used in matching programs can make them ineffective, according to the paper. They may also "transform the presumption of innocence into an assumption of guilt" and circumvent constitutional and legal protections for citizens, the researchers said.

The paper added that although the detailed data necessary for "sound policy recommendations" is not available, the computer techniques do raise a number of theoretical implications, including the possibility they will merely shift the types of crimes detected.

The two authors said these uses of computers are an indication of "an irreversible continuing historical process of more intensive and extensive social control."

Beyond that, they said, "powerful new discovery means may overload the system. Authorities may discover far more violations than they can prosecute or process. This overabundance can lead to the misuse of discretion and demoralization."

Runs in CMS Environment

Burroughs Unwraps B95 Desktop Micro

By Tom Henkel
CW Staff

DETROIT — Burroughs Corp. has announced the B95, an entry-level desktop computer system based on a proprietary microprocessor set that operates in the same software environment as a number of previous Burroughs computers.

The B95 functions under the firm's Computer Management System (CMS), the same operating environment as larger Burroughs processors including the B80, B800, B90, B900, B1900 and the CP 9500. CMS consists of the Master Control Program operating system, high-level language compilers and utilities and a number of business management application programs.

The B95 is targeted at budgetary accounting, inventory management, patient accounting, payroll and asset management applications, the vendor said.

The B95 consists of three basic units: a power supply unit, a processor and a data storage module. It is available with between 256K and 512K bytes of main memory and a maximum hard disk storage capacity of 28.8M bytes, the vendor said.

The processor module includes main memory, a disk controller and a data communications controller, Burroughs said. The storage module comes with a standard 9.6M bytes of formatted 5¼-in. hard disk storage, plus 700K bytes of floppy disk storage. Users have the option of substituting a 14.4M-byte hard disk drive for the 9.6M-byte drive for an additional $300. In addition, a second storage unit, offering only the 14.4M-byte hard disk storage, can be added to the B95 system to bring the total storage capacity to 28.8M bytes. The additional storage unit costs $5,095, a Burroughs spokesman said.

The B95 can be used as a standalone desktop system or as a satellite processor in a network with other Burroughs systems. The system can operate in a standard office environment, and most configurations are customer-installable.

In addition to the CMS operating system, the B95 is equipped with Superstart, a program that presents the operator with a series of menus that serves as a guide to using the system. The Superstart package, Master Control Program and assorted utilities are available for a one-time license fee of $2,850, Burroughs said.

A basic B95 configuration, consisting of 256K bytes of main memory, 9.6M bytes of hard disk storage, a 180- to 230 char./sec printer and a Burroughs ET 1100 workstation, costs $18,417.

There are two basic software maintenance plans for the system. A phone-in maintenance service costs $205/year, and an expanded maintenance service, which includes on-site maintenance if necessary, costs $410/year. A limited-time, or month-to-month, software rental plan costs $100/mo, a spokesman said from Burroughs headquarters in Detroit, Mich. 48232.

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Study Finds Micros Managed

(Continued from Page 1)

puters, while 74% have micro training programs, and 73% integrate microcomputer planning with all other computer planning, according to Ward.

Of the 100 companies, 23% have more than 100 micros, and 50% have between two and 25 micros, with the following overlapping applications breakdown: 47% used for stand-alone accounting; 36% for mailing lists; 80% for budget forecasting; 28% for cash management; 23% for time-sharing (terminal emulation); and 70% for word processing, Ward said.

He emphasized that this study differed from many others that have found corporations lacking in both advanced communications applications and in establishing microcomputer policies. Because the study found so much interest in hooking microcomputers together, Ward said "Micros are being used in a communications mode, and this needs to be addressed in the coming year."

The study will not be available for several months, but more information is available from the National Association of Accountants, 919 Third Ave., New York, N.Y. 10022.

Scrooge

What might have happened if old Ebenezer had been a sort user!

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Unless your name is Charles Dickens.

Scene: The computer center of Scrooge & Marley, a busy counting-house. Enter Bob Cratchit, systems programmer and father of a large family.

Cratchit: Excuse me, sir. I was wondering if I might have December 25th off.

Scrooge: Bah, humbug, Cratchit! You know we have all those sorts to run by the end of the year. And nobody to run 'em but that green kid you hired. What's his name?

Cratchit: Tiny Tim, sir. (Bravely) He's my son and he says it's our sort program that's causing the trouble. He thinks we ought to try SyncSort—

Scrooge: Humbug, man! Our sort is made by the World's Leading Hardware Manufacturer. (Jams on his hat.) Now be here all the earlier on the 26th!

Scrooge takes a solitary meal at his local fast-food outlet and then retires to his gloomy bedchamber. Perhaps as a result of what he has eaten—a tacoburger washed down by a low-calorie soda—he experiences a harrowing nightmare.

He is visited not only by the ghost of his former partner, Jacob "Damn the Software" Marley, but also by the Ghosts of Data Processing Past, Present and Future.

Ghost of DP Present (as he shows Scrooge the Cratchit family gathered for their holiday meal): Yes, a happy family, but—alas—one over whom a cloud hangs. Poor Tiny Tim...

Scrooge: Is there no hope for the little chap, Spirit?

Ghost: No...unless Tiny Tim receives a new sort program, his operations are...doomed!

When Scrooge finally awakens from his ordeal, he is a greatly changed man. Happy to be alive, he springs from his bed, throws open his windows and calls to a blue-jeaned youth in the street below.

Scrooge: You there, boy! Do y'know the fine, big sort program that hangs in the shop down the street?

Boy: Crikey, sir, you must mean SyncSort.

Scrooge: I do indeed. Run and tell 'em to send it here at once! A half crown if it arrives in less than five minutes. (Chortling) I'll send it along to Tiny Tim. If that doesn't goose up his sorting, nothing will.

From that day to this, no man keeps the holidays better than Scrooge, and nobody sorts better either. To Tiny Tim, who has just received his MBA, Scrooge has been a second father.

And to his other employees, who now enjoy ten paid holidays a year, Scrooge is as good a man and as good a master as anyone in the good old world of data processing!

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Redundancy Prevented Serious Danger

Nasa Probing Failure of Shuttle Computers

By Peter Bartolik
CW Staff

HOUSTON — Redundancy paid off again for the National Aeronautics and Space Administration (Nasa) and its astronauts when two computers failed prior to and during the landing sequence of the space shuttle *Columbia* on Dec. 8.

No official cause for the failures has yet been determined, a Nasa spokeswoman said last week, but the sequence of events began at the same time that an automatic firing of jet thrusters in the nose of the craft rocked the vehicle with a force that Mission Commander John W. Young said was probably as great as anything ever experienced on a shuttle flight.

"It really hit the vehicle hard," Young reported here to Nasa's Mission Control after the incident, adding, "It was probably as high a magnitude type of thing as we have seen."

Simultaneously, the ship's No. 1 computer shut down and its task of handling the guidance and navigation systems was immediately taken over by the second of four redundant IBM Advanced System/4 Pi Model AP-101 computers. But five minutes later, following another thruster firing, the second computer also shut down, and Mission Control commanded the third computer to take over the vital guidance and navigation functions.

"Nothing has been proven," Nasa spokeswoman Lisa Malone said last week when asked if it had been determined that the thruster firings had definitely been linked to the computer failures. Engineers for Nasa, Rockwell International Corp. — the prime contractor for the shuttle project — and IBM will work jointly to attempt to pinpoint the cause, she added.

"IBM is conducting an extensive study to see what went wrong," according to Joseph Melitano, a spokesman with the company's space shuttle program. The units that failed were removed from *Columbia* and were to be flown for analysis to IBM's Owego, N.Y., facility where they were developed, he added.

The initial failures, however, were not the last of the problems for the mission. Flight controllers succeeded in restarting the second computer, but were unable to restart the first. Then, just as *Columbia* touched down almost seven hours behind the original schedule, the No. 2 computer again failed. (Nasa technicians also discovered last week that during the landing a small fire occurred when fuel leaked from an auxiliary power unit used to drive the ship's hydraulic system.) Another problem encountered earlier in the day was the failure of one of three inertial measuring units.

Redundancy and backup systems are terms that have come to be synonymous with the U.S. space program. "That's why the astronauts were not in any danger," according to Nasa's Malone.

According to IBM's Melitano, four computers are tied into a redundant system, and a fifth acts as a backup and is generally called into use only during "critical mission phases" such as ascent and descent. Any one computer can control and land the craft, he said, and each of the four main computers is also assigned to monitor specific functions during flight, such as navigation and guidance or reentry procedures. The redundant configuration incorporates a method for prioritizing functions, and each computer "votes" on the task at hand.

The recent shuttle mission, the ninth to date, set a number of firsts for the program: the largest crew, six men; the longest mission, 10 days; and the first use of Spacelab, a European Space Agency orbital research facility that was carried into orbit and returned to Earth in the shuttle's cargo bay and was also the heaviest payload.

Inquiry: Human Error Probable Cause For KAL Presence in Russian Airspace

By Patricia Keefe
CW Staff

MONTREAL — One of two human errors in operating computerized navigational equipment is the most probable explanation why a South Korean airliner strayed into Soviet airspace Sept. 1, according to a report under consideration by the 33-member governing body of the International Civil Aviation Organization (Icao) here.

The study discounts Soviet claims that Korean Airlines (KAL) Flight 007 was on a spy mission for the U.S. and charges the Soviets did not make "exhaustive efforts" to identify the airliner before shooting it down, killing all 269 people on board.

The report also rejected other theories about why the plane deviated from its normal course, including taking a shortcut to reserve fuel, a hijacking or navigational equipment failure.

The two theories strongly supported by the report hold that the plane strayed 300 miles off course because the crew either input incorrect coordinates for its Anchorage, Alaska, departure point into the inertial navigation computer system (INS) [CW, Dec. 5] or neglected to attach the automatic pilot to the INS. Under the latter theory, the automatic pilot would have kept operating on a constant heading rather than providing the successive heading changes computed by the INS.

The report concluded, "Each of these postulations assumed a considerable degree of lack of alertness and attentiveness on the part of the entire flight crew, but not to a degree that was unknown in civil aviation," an Icao spokesman confirmed.

Also, the inquiry team found no evidence to support the Soviet supposition that the KAL airliner was on a spy mission, according to the spokesman. Although the Soviets claim the airliner delayed its takeoff for 40 minutes to coincide with the passage of U.S. satellites, the inquiry team's report refutes that charge.

The report states that KAL airliners customarily alter their flight plans to account for the "winds aloft," which vary daily. The KAL pilot did nothing out of the ordinary when he delayed his flight for 30 minutes to ensure that he would not reach Seoul, South Korea, before his scheduled arrival time, the spokesman said. "The flight plan is based on the winds aloft, which can alter flight time by as much as 40 to 50 minutes," he added, noting "this pattern [of behavior] was traced back over months."

Soviet and Czechoslovakian representatives of the Icao "have had some difficulties" with the 100-page document, as well as with a resolution recently passed by the governing body, the Icao spokesman said. Under that resolution, the governing body agreed to:

- Reiterate its resolution of Sept. 16, calling on all parties to the investigation to cooperate fully and furnish the Icao with all the information about the incident at their disposal as soon as possible.
- Refer the seven-member inquiry team's report to the Technical Air and Navigation Committee (Tanc) for review.
- Review Tanc's findings at its next session, which begins Jan. 23, reporting final conclusions in late March.
- No longer restrict the character of the council working paper.

Attached to the inquiry team's report is an 18- or 20-page preliminary report filed by the Soviets as a result of their own internal state investigation, the Icao spokesman said. "This statement makes it quite clear that the Russians considered the plane to be an intruder on an intelligence-gathering mission," he continued. Further, the preliminary report cites the airliner's sudden climb of 2,000 feet and its loss of speed, which the Soviets took to be an evasive action. Shortly after receiving permission from Japanese air controllers to climb 2,000 feet, KAL Flight 007 was shot down.

The inquiry team has concluded that the Soviets did not make exhaustive efforts, such as flying close to read the print or logo on the airliner's side, in order to identify the plane. The spokesman said that the Soviets claim to have attempted to communicate with the airliner's crew on a frequency different from the one used by the air controllers and so would not have overheard any conversation on the latter frequency.

The secretary general of the Icao, also a member of the inquiry team, personally visited the Soviet Union to request that state officials turn over a number of items thought to be in their possession, including video recordings and tape transcripts. Although Soviet officials have not yet turned over any of the requested evidence, they did say they would take the secretary general's request under consideration, the spokesman added.

Amdahl to Release Alternative to MVS

(Continued from Page 1)

whether Aspen will be compatible with other systems, data base management and applications software now supported by MVS.

Amdahl has said little about the project at this point other than to comment that Aspen will be designed to operate on any IBM 370 architecture machine. The spokesman said the principal attributes of Aspen are its "ease of use for operating staff and system programmers.

"I think the one word to describe it is simplicity," he said. "It does a lot of things that a systems programmer now has to concern himself with, such as data set allocation, which has to be done stringently by a systems programmer."

Early reports have described Aspen as being a "stripped-down" version of MVS, but the Amdahl spokesman bristled at that suggestion. "It was completely innovative from the start," he said. "Some of the control block interfaces are similar, but there was no attempt to emulate or duplicate MVS." He added that most of the essential performance features of MVS have been retained.

Aspen's price will "probably be 20% to 25% lower than MVS," according to Robert Fertig, president of Enterprise Information Systems, Inc., a research group based in Greenwich, Conn. However, the Amdahl spokesman said no price has been set.

In developing Aspen, Amdahl becomes one of the few software vendors ever to challenge IBM in the operating system realm. However, the spokesman said the company does not regard the four-year development effort as a risk.

"We feel there's kind of a vacuum out there for an operating system with a high-transaction orientation for development on a very efficient basis," he said.

As Amdahl's first research and development project in the operating system category, Aspen signals a new thrust by Amdahl into systems software. The company already offers the Unix operating system on its 470 and 580 processors.

"We've done things in the productivity and compatibility areas before. That, plus this program, are indications that it's more important for us to get into software," the spokesman said.

Western Electric Gets New Name, New Structure

(Continued from Page 1)

units will report to Olson. This arrangement, he said, will "make it easier to set common policies.

"We decided to organize our resources by lines of business in the belief that customers will be served best by a fast-moving organization focused on specific markets," he explained last week at a New York/Washington, D.C., press teleconference. Integrating manufacturing and product development "will translate customer needs into products and systems in the fastest, most efficient way. The head of each business unit will now have control over all the resources necessary to be successful and will be accountable for the profitability of that business worldwide."

Olson added that AT&T regards its deregulated subsidiary as "another line of business," larger than any of the four derived from Western Electric. After repeating AT&T's oft-stated objection to the Federal Communications Commission's (FCC) Second Computer Inquiry Decision, which requires AT&T terminal equipment and computer-based online (enhanced) services to be marketed through a separate subsidiary, Olson indicated that after divestiture officially occurs Jan. 1, the company will argue the decision is no longer needed, since it is based on predivestiture conditions. If this campaign fails to change the FCC's mind, Olson said, Western Electric plants that currently manufacture products marketed by AT&T Information Systems will be transferred to that subsidiary.

AT&T Technologies, Inc. will consist of four marketing divisions devoted to network systems, consumer products, "technology systems" (components, electronic systems, computer systems and federal systems) and international sales. The head of each division will report to Donald Procknow, currently president of Western Electric. He is vice-chairman and chief operating officer of AT&T Technologies, Inc.

Procknow reports to Olson, along with Ian M. Ross, president of AT&T Bell Laboratories, and Charles Marshall, chairman of AT&T Information Systems.

Articles on Apple, IBM Micros Indexed

SOUTHBURY, Conn. — BP Publications has announced a series of indexes to magazines that publish articles relating to business computing and personal computers from IBM and Apple Computer, Inc.

The bimonthly indexes, available now, reportedly cover 12 magazines with articles about Apple computers, 11 magazines for the IBM Personal Computer and 10 magazines with articles about business computers.

Subscriptions for 1984 are priced at $22 for "The Apple Index," $24 for "The IBM Personal Computer Index" and $28 for "The Business Computer Index." An annual cumulation of each index costs an additional $10.

Information is available from BP Publications, P.O. Box 617, Stiles Road, Southbury, Conn. 06488.

AT&T Chairman Tells Why They Did It

NEW YORK — "We could have chosen to call this new enterprise the Western Electric Co. We chose instead to put all our resources and reputation behind the AT&T name."

In this way, Charles L. Brown, chairman of AT&T, explained and characterized the sweeping reorganization of his company while speaking before security analysts here last week.

AT&T essentially divided its business into two parts: the regulated Long Lines segment of the business, now called AT&T Communications; and AT&T Technologies, Inc., consisting of AT&T's unregulated entities (see related story) under the leadership of James E. Olson, AT&T vice-chairman.

Brown told the analysts that the reorganization is "a major step to shape the new AT&T into a company that is organized to make the most of the business opportunities now open to us in unregulated markets." AT&T Technologies "will assume the corporate charter of the Western Electric Co. The Western Electric name will not be retired. Rather, it will be displayed on AT&T's telephone products," Brown said.

"As for our market, we see it as nothing short of global," according to Brown. "The organization we are creating today will help greatly to break down any remaining barriers that might keep us from thinking of the business in global terms," he said.

Brown claimed that "commotion over divestiture" had distracted attention from the company's many product introductions this year, adding that internal demand for Western Electric's integrated circuits "increased threefold" over last year.

The reorganization notwithstanding, Brown warned analysts that "1984 will not be an easy year for us," labeling the next 12 months a "shape-up year" in which the company will seek to consolidate and organize its businesses. However, he promised analysts that the company would eventually produce a return on equity "higher than in predivestiture days."

Asked if AT&T had any plans to acquire smaller firms, Brown said, "While we have no inhibitions against it, we have no immediate plans we are ready to announce."

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Banks' Systems Ready for Holiday Season

By David Myers
CW New York Bureau

NEW YORK — With Christmas less than a week away, banks here are stockpiling clean, crisp bills for their customers to hand out as job-well-done tips to New York's legion of superintendents, doormen and parking-garage attendants.

But in other ways, banks in the Big Apple began preparations for the Christmas crush a long time ago.

"Our planning year is based on the Christmas rush. If we can get past Christmas, we can relax in January," said Alan Silberstein, senior vice-president of retail operations at Chemical Bank here.

For the banks' systems managers, this means new computer equipment has to be in place, tested and broken in well before Thanksgiving. The Christmas shopping season begins the day after America's fall feast and runs until the day of Christmas Eve, according to banking executives.

A spokesman for the Bank of New York said business does not slack off even then; what with January white sales and customers exchanging their Christmas gifts for something a little more suitable, the first month of the year is as busy a month as the last.

Business is particularly brisk in at least two areas: remittance processing and credit card transactions.

Remittance processing is up during December, according to William W. Shine, senior vice-president of operations and systems for Chase Manhattan Bank. Shine speculated that customers increase the number of payments on their charge card accounts in order to boost the amount of credit they have available to them for Christmas presents.

Credit Card Transactions

Credit card transactions are heavier in the 30 days between Thanksgiving and Christmas than at any other time during the year. These strain the banks' computer systems for both processing the sales tickets and authorizing the purchase to the merchant, according to Shine.

"Christmas purchases are in large measure made by plastic," Shine pointed out. The reason for this seems obvious: Christmas shoppers do not want to know how much they are spending until after the Christmas spirit has worn off.

In preparation for the heavy volume of charge account activity, the banks must purge their computer storage disks just prior to Thanksgiving. This gives them more room for the flood of shopping data to come.

But credit card purchases place the stiffest burden on banks' authorization setups. Banks that authorize credit card payments automatically have to make sure they have provided enough access routes into their computers' modems.

Banks that OK the transactions in a telephone conversation between a store clerk and a bank worker must hire additional personnel for the holidays.

In fact, the greatest strain on banks' resources during the Christmas trading period is not on their systems, but on their personnel.

"Our biggest problem in getting the work done is not the [shopping] rush, but the terrible imposition on [bank employees] who want to go out to shop for Christmas," Silberstein said.

Just like the hordes of last-minute Christmas shoppers, customer traffic in the bank branches is heaviest on the Friday before Christmas, Dec. 23 this year. So extra tellers are needed, and even bank executives are pressed into service. "Everyone does a day in the branches," Silberstein said.

Airlines' DP Shops Beat Christmas Rush

(Continued from Page 1)

casting models and a base of historical data to predict capacity peaks and equipment and personnel needs. A spokesman for American said the airline can anticipate activity volume almost on a daily basis as a result of that modeling.

At United Airlines, capacity planning is "pretty much a science," according to Michael Schwab, director of the Chicago Computer Center. "The increased demand doesn't affect us because we have plenty of capacity. We're extremely well positioned to respond to these peaks because of our ongoing planning, which incorporates a combination of modeling and projection methodologies and historical data on past capacity usage."

In most airline DP environments, reliance on capacity planning is coupled with a programming change freeze, or moratorium, intended to prevent costly system disruptions. At Trans World Airways, for example, "Our real-time reservation system is designed to handle the added volume during this season, but to be certain that we don't upset things, we institute a system freeze. We don't allow anything but emergency programming changes during that time," said Ted Celentino, director of systems and programming.

Republic's DP shop has a two-level moratorium policy. During that airline's restricted period, which extends from Thanksgiving until mid-December, programmers are told to avoid "non-error-correcting or non-revenue-producing changes," Voth said. During the stricter change freeze period from mid-December until Jan. 3, only critical or "emergency" changes are allowed.

"Even if you test a program extensively before you bring it into the production environment, you're going to experience some system degradation at first," said Delta's Condra. "Our mission is to provide good, uninterrupted service, and the freeze provides us with optimum response time and availability during this period."

For the airlines that do not impose a programming moratorium, planning is still the key to success. "We don't have a hard-and-fast blackout," said American Airlines spokesman Al Becker. "Our whole programming effort just can't grind to a halt. But our activities are carefully scheduled so that no major hardware or programming changes occur during peak usage times. It's simply a matter of tight management control."

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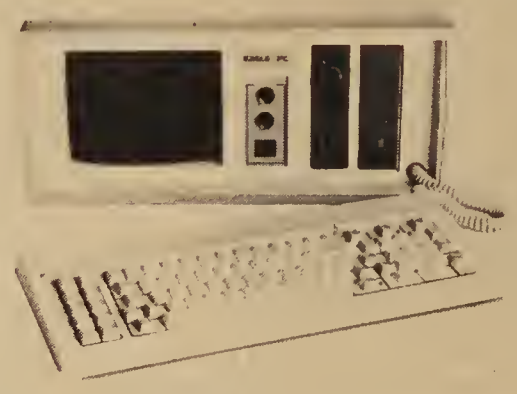

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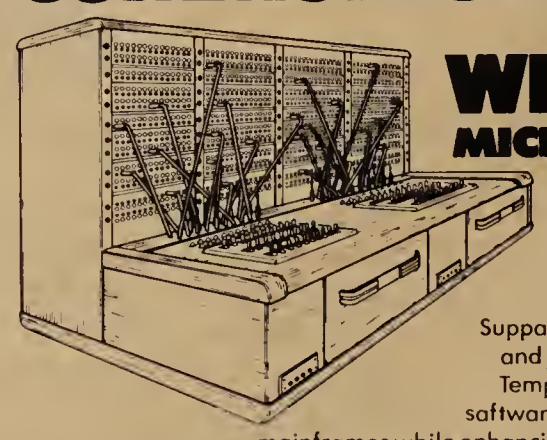

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U.S. Supreme Court Says No to Divestiture Review

WASHINGTON, D.C. — Unanimously and without comment, the U.S. Supreme Court refused this past week to review the AT&T divestiture plan which resulted from the settlement of the U.S. vs. AT&T antitrust suit.

The court's action removed what is probably the final barrier to implementation of the divestiture Jan. 1.

The appeal was filed by California and New York, which argued, among other things, that inside wiring and "station-handling costs" — the expenses of transporting a terminal to the customer's site, installing and testing it — should have been transferred to AT&T rather than left with the divested Bell operating companies. These expenses total about $2.3 billion, according to California's appeal.

Baxter Resigns as Head Of Antitrust Division

WASHINGTON, D.C. — Saying that he's "burned out" and eager to resume his teaching post at Stanford University, U.S. Assistant Attorney General William Baxter resigned effective last Friday as head of the Justice Department's Antitrust Division.

Succeeding Baxter is J. Paul McGrath, the chief of the Justice Department's Civil Division, who worked for AT&T as a private antitrust attorney.

Baxter, a firm believer in the idea that bigness in business is not necessarily bad, dropped the government's 13-year-old antitrust suit against IBM on Jan. 8, 1982, the same day he announced the settlement of the government's seven-year-old antitrust suit against AT&T. Although the latter action broke up the world's largest corporation, it was criticized as not going far enough, and U.S. Federal District Court Judge Harold Greene, who is presiding over the AT&T divestiture, forced the company last summer to accept additional restraints.

Baxter's resignation and McGrath's succession were announced at a press conference here, during which the new head of the Antitrust Division stressed the need to "avoid handicapping business" by penalizing economic efficiency in a competitive environment. Because of his past association with AT&T, McGrath said he would disqualify himself from matters involving the Bell System.

U.S. Attorney General William French Smith and Deputy Attorney General Edward C. Schmults have also disqualified themselves for the same reason.

Ellinghaus Announces Retirement From AT&T

NEW YORK — William M. Ellinghaus, who began his career 44 years ago as an installer for the Chesapeake and Potomac Telephone Co., announced last week that he is retiring as AT&T's president and chief operating officer.

No successor to Ellinghaus was named.

Long interested in the arts, Ellinghaus, 61, will become board chairman of New York City's Channel 13 (WNET). He also will devote much of his time to the National Arts Stabilization Fund, which provides financial support to artistic organizations.

FCC Chairman Defends Commission's Rulings

WASHINGTON, D.C. — "Universal service will not be impaired by recent FCC [Federal Communications Commission] decisions" despite "demagogic statements" to the contrary, according to FCC Chairman Mark Fowler.

The first part of that statement was contained in a letter Fowler wrote earlier this month to two Republican congressmen who had asked for the FCC's views on legislation approved by the House of Representatives a short time earlier. That legislation would require drastic revision of the access surcharge plan the commission unveiled a year ago.

State utilities regulators are ardent supporters of the legislation. Among the most ardent are Susan W. Leisner, a member of the Florida Public Service Commission, and Eric Schneidewind, chairman of the Michigan commission.

Fowler's remark about "demagogic statements" was made at an FCC meeting held a few days before he sent his letter. At that meeting, the FCC commissioners concluded that their recent decisions — particularly the controversial access surcharge — have not been responsible for higher local telephone rates. The FCC chairman said statements by Leisner and Schneidewind were examples of what he had in mind.

The FCC's conclusion that its decisions in recent years are not responsible for higher local phone rates rests on a four-month analysis of data the commission solicited from all the states.

One major finding of this analysis was that only about 40% of the rate increases being requested by the Bell operating companies and the four largest independent carriers this year are being granted. Moreover, two-thirds of the increases allegedly are linked to changed depreciation rules, inflation, higher wages and other factors not related to federal decisions.

Fowler, in his letter to the two Republican congressmen, alluded to this analysis in supporting his contention that the commission's decisions of the past few years have not put universal telephone service in jeopardy.

The letter was addressed to James T. Broyhill (R-N.C.) and Don Ritter (R-Pa.), members of the House Energy and Commerce committee.

The committee's telecommunications bill, H.R. 4295, along with a companion Senate measure, S. 1660, are likely to receive final consideration when Congress reconvenes.

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Bristol-Myers Exec Cites Problems

Companies Urged to Plan Technological Change

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — Despite its great importance, technology planning is still such an infant business discipline that very few big organizations have had a chance to start practicing it, according to Bristol-Myers Co.'s Personnel Development Director Jan Margolis.

Failure to plan effectively for emerging information technologies has already cost some large corporations dearly, Margolis said last week at a conference sponsored by Boston-based *Data Training* magazine. To underscore her point, she cited the example of a very large New York bank that neglected to plan adequately for its purchases of word processing systems and finally wound up with 25 models from 10 vendors. Because of their inevitable incompatibilities, few, if any, of the competing products could communicate coherently with the bank's host processing system.

Speaking at the fourth annual Data Training Conference and Exposition, Margolis characterized the bank's systems' woes as the product of an organization that "was driven by vendor product strategies rather than by its own technology plans."

Failure to Standardize

In a second example of poor technology planning, Margolis related the case history of a major office products supplier whose failure to standardize its purchases of electronic mail systems resulted in the acquisition of 10 models, all incompatible. Such horror stories, she said, dramatize the dangers that can befall big companies, even high-tech vendors, when they "fail to think through their technology needs."

During her Dec. 13 keynote address, Margolis characterized information technology as playing an increasingly important role in shaping the big business world's products, services and operations. The use of that technology — and its possible long-term consequences — have to be carefully planned.

In particular, large organizations have to assess how the introduction of new information technology into their work places will affect their employees, who need to be effectively managed if the firms are to achieve their key objectives, Margolis said.

Although technological change within a large corporation can often prove beneficial, it also exacts at least a moderate human toll by:

- Adding to a position's intellectual content and thus increasing a jobholder's pressure and stress.
- Changing the ways employees interact socially while at work.
- Intensifying the need for lateral coordination across different corporate functions.
- Requiring workers to acquire new professional knowledge and skills continually as their jobs swiftly change.

Once companies commit themselves to adopting a new information technology, they need to educate their employees to cope with the resulting changes in their work. Ironically, Margolis said, at least some of that instruction can be significantly aided by computers — the same phenomenon that is forcing workers to adapt in the first place.

Unlike most of history's other major agents of technological change, "computers create enormous opportunity for individualized education on a mass scale," she said.

Instructors Told Timeliness as Crucial as Content In Training Data Base Development Teams

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — Timing is as important as content in effectively training the diverse members of a data base development team, Douglas Stewart, an education advisor at Aetna Life & Casualty Co., said here last week.

In devising a sound data base instruction course, trainers have to do much more than just correctly identify the various topics that need to be covered.

They also have to know at precisely what point during a project development cycle each topic should be presented for the optimum results, Stewart said during a conference that was sponsored by *Data Training* magazine.

In addition, he said, data base trainers need to be cognizant of at least one other important fact: that the educational needs of each of a project team's four constituent groups — DPers, end users, general managers and data base administrators — differ widely and have to be defined accordingly.

For example, of the four major groups involved in creating a typical data base, only the data base administrators require instruction in access methods. The best time for the training is sometime during a project's design phase, Stewart said during the fourth annual Data Training Conference and Exposition.

On the other hand, data base administrators can be justifiably exempted from any education involving information or data modeling. But for the other three groups, he said, at least some teaching of modeling is indispensable. This training should be conducted in the project initiation phase for general management and in the specification/definition stage for end users and DPers.

In addition to covering access methods and information or data modeling, a well-conceived educational course for data base development should address topics such as performance tuning, data manipulation languages, data dictionary languages and physical design, according to Stewart. Environmental communications control and data base concepts, both generic and product-specific, should also be covered, he maintained.

Only in one of the recommended topic areas — generic data base concepts — do all four of a project team's member groups need the same kind of training at exactly the same time — during the initiation phase, Stewart said.

At one point or another during a development cycle, DPers should receive data base education in all the suggested topic areas, except access methodologies and data dictionary languages. End users, by contrast, should concentrate on learning about performance tuning, data manipulation languages, modeling and data base concepts, he said.

High-Level Aids Topic of Series

WAKEFIELD, Mass. — Digital Consulting Associates, Inc. has announced symposia focusing on new data base and fourth-generation language products.

Featuring 14 guest lecturers from various corporations, the series will be held in Los Angeles, March 6-9; Washington, D.C., April 24-27; Chicago, May 15-18; and New York, June 15-18.

The fee is $375 for the first day alone and $750 for the four-day conference.

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Former Insurance Employee Jailed for Fraud

By James Connolly
CW Staff

TOLEDO, Ohio — A one-time Aetna Life & Casualty Co. worker has begun a six-month prison sentence for using a computer to issue more than $8,000 in phony dental insurance benefit checks to her relatives.

Ila R. Barringer, who received the sentence, her sister Hazel M. Wood and Wood's sons, John Morris and Clifford Morris, all of Toledo, pleaded guilty to a charge of single conspiracy to commit mail fraud in exchange for prosecutors dropping the balance of a 12-count indictment. Wood, also a former Aetna employee, and John Morris were placed on probation; Clifford Morris will be sentenced in January.

Barringer received a more severe sentence than her sister and nephew not only because she was judged more culpable, but because even after the $8,473 scam at Aetna was discovered, she engaged in a similar scheme with another employer, according to U.S. District Court Judge Donald J. Young.

Thomas Middleton, assistant claims manager of Aetna's Toledo office, said Wood and Barringer were customer relations representatives who were primarily involved in telephone contact with customers, but also had clearance to process claims through an IBM 3081 mainframe located at Aetna's headquarters in Hartford, Conn.

"What these two would do is process dummy claims under the Morrises' files and issue drafts to the Morrises, then blank out all of the data in the file so that if anybody looked, the file would seem empty," Middleton explained.

Middleton said that on at least 10 occasions between 1979 and 1981, the computer produced checks for the Morrises, whose names were in the computer's memory because they had once been covered by Aetna group policies in jobs they held briefly.

Assistant U.S. Attorney James Jensen reported that U.S. Postal Service inspectors were called in by Aetna when an internal audit indicated there were no claim files to justify the checks.

But by that time, in 1982, both women had left Aetna. Wood, a 10-year employee, was fired for altering and cashing a $1,600 check issued to Aetna; Barringer, a four-year employee, quit, according to Middleton.

Jensen commented, "The judge said that [Barringer] hadn't learned from the previous circumstance."

"Barringer went to another company, where she was in a position to issue claims and issued checks for $6,600. Even after she was interviewed in our case, she issued one other check. The judge said that although the check was small, the same elements underlie the case," he said.

Wood was not charged in the check case, and Barringer, who has been ordered to make restitution to Aetna, has not yet been charged in the $6,600 case involving an undisclosed company.

Barringer's attorney, Harland M. Britz, said she "admitted doing everything. There was no defense." He noted that he had objected to the "apparent disparity in sentences" between Barringer and her sister, who had similar computer access. He said Barringer became involved in the conspiracy at a time when her house was being foreclosed and she was being threatened with the shutoff of gas to her home.

Middleton noted that Aetna supported the prosecution as a deterrent to other schemes.

Aetna spokesman Thomas Collins declined to comment on the frequency of cases such as Barringer's or on the company's security measures. The company reportedly has been examining more closely cases where checks are made payable to the insured, rather than to vendors.

Collins also disputed the description of the case as a computer crime. "It's happened occasionally throughout the years, not only in insurance companies. It used to be done by hand, and now it's being done by computer.

"The frequency is probably less than it used to be because it is much more difficult to do it. There is a tremendous amount of checks and balances built into a computer system," he said.

User Support Exec To Address Nestu

WELLESLEY, Mass. — The head of the U.S. subsidiary of a worldwide IBM System/34, 36 and 38 users support organization will address a meeting of the Northeast System/38 Users Group (Nestu, Inc.) at Wellesley College here Feb. 21.

Robin M. Retallick, appointed in February as president of Johnston, Brown and Associates, Inc., will speak at afternoon and evening sessions on "System/38 — Past, Present and Future" and "A System/38-Based Company MIS — the Five Most Common Mistakes."

Retallick spent 13 years with IBM, most recently as manager of product marketing for IBM Australia.

The cost of attending the meeting is $35 for members and $50 for nonmembers. Nestu is at 64 Temple St., Spencer, Mass. 01562.

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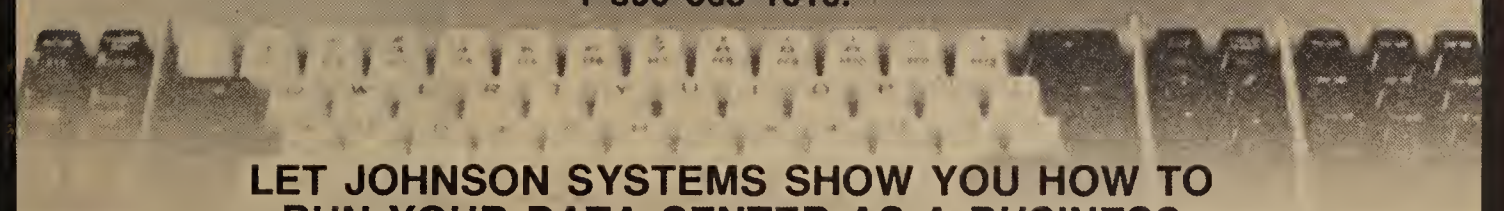

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Xerox Exec Hits Practices of Local Net Industry

By Robert Batt
CW West Coast Bureau

SAN DIEGO — The local-area network industry is riddled with immature business practices, a senior executive from Xerox Corp. said here last week.

Speaking at the Multiuser Systems and Local Networks Forum sponsored by Future Computing, Inc., John Shoch, vice-president of Xerox's Office Systems Division, said many products that are labeled "local networks" are in fact merely channel interfaces.

Moreover, Shoch maintained that the controversy between broadband and baseband techniques for the networking of data is irrelevant. He compared it to the struggle 100 years ago between ac and dc for prominence in the electrical industry.

"In the long run, whatever local network you choose doesn't make a difference," Shoch told an audience of data processing professionals. "The important question is, what problem are you trying to solve rather than what local network are you going to buy?"

Shoch said it is the application that defines the use of networks, and that will continue to influence how they are used in the future. He warned that those users and vendors who are not considering the use of higher level protocols and architectures face a very rocky road.

"If you think selecting your local network is your problem, you are mistaken. It is, in fact, only 1% of the problem. You need to understand all the other layers of the communications hierarchy to implement an effective solution," Shoch added.

The RS-232 Bottleneck

The application of local-area networks was also addressed at the conference by Robert Metcalfe, chairman of 3Com Corp. Metcalfe said it is important to break the RS-232 interface bottleneck which, he claimed, has been holding back progress in communications technology for several years.

As far as the use of local-area networks with microcomputers are concerned, Metcalfe sees the emphasis shifting from the sharing of peripherals to the ability to access information from mainframes and store it on a personal computer.

"The percentage of information kept in mainframes will plummet as more and more information becomes stored in local personal computer groups," he predicted.

Local networks, Metcalfe asserted, are moving into the domain of personal communication, particularly in the areas of electronic mail, voice and data-based messaging, distribution, filing, integration and processing of information.

True multiuser software will be the key determinant in the evolution of shared data bases, he added, and application software for local networking of personal computers will be at the frontier of this technology.

According to Allen Malinger, senior manager for local-area networks at Datapoint Corp., the key issue is the upper layer of software integration available to the end user.

"Users want to access any file on a universal basis and in a way that is transparent to him or her. Users do not need to know how the module works, but they do need to know how to interface at each level of the module," Malinger asserted.

Turning to the problems of the DP executive, Mark Warshaw, network product manager at Corvus Systems, Inc., said the management information systems manager will be closely concerned with network services as they continue to grow.

"The DP manager will be increasingly faced with the problem of how to coordinate information flow through the organization where that information flow is, in part, a model of the organization itself."

In this connection, Warshaw added, it will be necessary to connect local-area networks with corporate mainframes. "Just because personal computers are growing in number and power does not mean that there are going to be any less mainframes. Central processors will always have their uses," he concluded.

Local Nets Need Standards To Promote Growth, Forum Told

By Robert Batt
CW West Coast Bureau

SAN DIEGO — Official standards are urgently required if the growth in local-area networks is really to take off, data processing professionals who gathered here were told recently.

John Hemphill, a senior technology consultant at Future Computing, Inc., told the Multiuser Systems and Local Networks Forum that three types of standards in particular are needed:

- A layered hierarchical communications architecture to insulate operating systems from communications hardware and to permit the use of various data link protocols such as Datapoint Corp.'s Arcnet and Xerox Corp.'s Ethernet.
- A network-level communications protocol for remote access to shared resources that supports logical access to remote resources and a multivendor workstation environment.
- A standard application program/operating system interface, which supports functions to control and access shared remote resources and insulates applications from the network design.

Involve Multiple Vendors

"Multiple vendors have to be involved in the creation of a standard. If you make a proprietary system a standard, you scare off third-party manufacturers who are the ones needed to develop the software and add-on products," Hemphill told the forum, sponsored by Future Computing.

Among the requirements necessary to make a standard, he said, are published open hardware and software interfaces, independent suppliers of network operating system software and workstations and file servers that are open for independent development.

To be successful in this market, Hemphill stressed, a vendor must provide a complete local-area network product with availability of multiuser, local network application software.

Single-user versions of this software must also be available to allow migration to a local network environment, he added.

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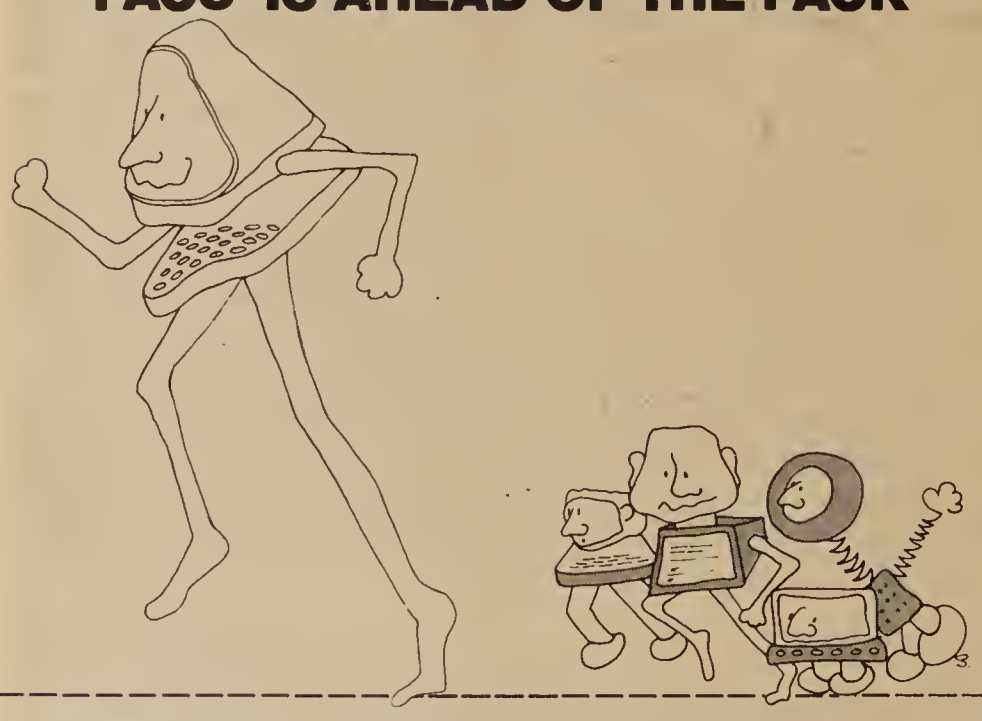

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Speakers Stress Cooperation

Integration of Micros, Local Networks Heralded

By Robert Batt
CW West Coast Bureau

SAN DIEGO — The era in which personal computers will be integrated into viable local-area network systems has arrived, according to speakers at the Multiuser Systems and Local Networks Forum held here last week by Future Computing, Inc.

Chris Langewis, cofounder and senior vice-president of international business at Phase One Systems, Inc., said local-area networks will be a growing product in the future, but not at the expense of competing approaches such as multiuser systems.

"We are going to see a multitiered market in which local networks, multiuser systems and stand-alone computers must be able to coexist. Local networks will, therefore, need to combine the other factors that exist in the market," he told his audience.

In a session devoted to local network issues, Carl Travillion, director of product management at NCR Corp., said the objective of local networks is to establish a logical link to additional corporate information resources, including personal computers, host computers and other networks. "To exploit fully the market opportunities provided by local networks, manufacturers must design for, rather than adapt to, software which provides a path to common user objectives," he contended.

The two biggest problems in the industry today, according to Travillion, are I/O and peripheral integration. So far, personal computers have proved themselves pretty bad at I/O and I/O management, he asserted; as for peripheral integration, microcomputer users will demand the same level of peripheral support as users of host processors, regardless of whether it is in the form of disks, tapes, drives or optical printers.

The NCR executive outlined a number of criteria to which good local network systems must conform:

- A system that is aggressively priced against multiuser systems.
- One that provides a more total system in terms of performance and usability than competing technologies.
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Travillion stressed that local-area networks will need to provide a great deal of security for future applications, particularly with the advent of "work-at-home" programs which, he claimed, are just around the corner.

"Networks should be designed in a manner in which a novice can enter the network and operate it without damaging the integrity of the data. It should also be flexible enough to cater to the experienced user through the use of passwords," he added.

The issue of data integrity was also addressed by Darrell Miller, marketing manager of software systems at Digital Research, Inc. Miller said that data security capabilities are especially important in the Microsoft, Inc. MS-DOS and IBM PC-DOS environments.

Requirements for an operating system in a shared computing environment include concurrency and real-time capabilities; support for micros from different vendors; support for multiple network types and multiple operating system types running on the network; and resource and information-sharing capabilities, according to Miller. "The integrity of the information in both multiuser and local network environments is an issue that we as an industry need to come to grips with very quickly," he concluded.

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Nets Seen Dominating Multiuser System Tech

By Robert Batt
CW West Coast Bureau

SAN DIEGO — Local-area networks will become the dominant technology in the multiuser system environment, Egil Juliussen, chairman of Future Computing, Inc., told the Multiuser Systems and Local Networks Forum held here last week.

Local-area networks possess a key marketing advantage over current shared processor systems in that they are an aftermarket solution to sharing information for existing microcomputer users, according to Juliussen. "A local network only adds an incremental inventory value to the existing personal computer inventory. The channels that are selling personal computers can, therefore, add a local network for a relatively low investment," he explained. "It is much harder for these channels to add a shared processor system."

In addition, Juliussen told the Future Computing-sponsored forum that local networks possess several technical advantages over shared processors which seem likely to ensure their long-term success. A local network, he claimed, has a performance edge; is less vulnerable to single failures; can handle more users per system without a lot of degradation; and can accommodate local peripherals for individual users.

Furthermore, the new type of windowing available in local-area network software, which permits different types of data to be simultaneously displayed on a personal computer, cannot be performed on a shared processor system, Juliussen said.

Short-Term Phenomenon

While shared processor systems currently have a cost advantage over local networks, this is a short-term phenomenon, the market researcher asserted. The economies of scale for local networks are huge, and a considerable amount of good software for these networks will appear in the next two years, he noted.

Turning to some of the key issues facing the multiuser personal computer industry, Juliussen predicted that IBM will introduce a local network within the next 18 months. It will probably be an open architecture, he said.

In the area of marketing, a key element is how effectively computer stores will sell local networks. Juliussen estimated that the number of computer stores selling local-area networks will jump from its current level of 15% to between 35% and 50% over the next few years.

According to Juliussen, the market for local networks will be fueled by a dramatic increase in the number of office workers who use personal computers. He predicted this figure will rise from its 1983 level of 3.8 million micros (or 7% of the office work force in the U.S.) to 50 million (or 65% of the work force) by 1995.

Currently, he estimated, around $6 billion is being spent in the office personal computer market, only 4% of which is allocated to local networks compared with 82% for stand-alone personal computers and 14% for shared processor systems.

By 1988, he predicted, the ratio will be 70% stand-alone personal computers, 25% personal computers in a local network and only 5% shared processor systems.

The installed base for local-area networks, he added, will rise dramatically from its current level of around 15,000 to over 450,000 by 1988, overtaking shared processor systems, which are estimated to grow from 100,000 units to 400,000 units over the same period.

In the office personal computer market, Juliussen concluded, Hewlett-Packard Co. leads the pack by a long way, while in the office/home market, IBM is on top with estimated revenues of $1.5 billion, followed closely by Apple Computer, Inc. and Radio Shack, each with approximately $1.1 billion in revenues.

ITS '84 Slated For April 3-5

MONTREAL — Teleglobe Canada has announced that Toronto will be one of five sites for the International Teleconference Symposium (ITS '84), slated for April 3-5.

The symposium will be conducted concurrently at five international sites — Sydney, Australia, Tokyo, London, Philadelphia and Toronto — linked via the Intelsat communications satellite system. It will feature fully interactive teleconferenced sessions, according to Teleglobe spokesman Philip van Leeuwen.

Presentations and discussions will focus on developments in teleconferencing services, equipment and networks.

The symposium is being sponsored by Intelsat and its signatories in the host countries. Symposium fees are $495 (Canadian) with registration before Jan. 31 and $595 (Canadian) for registration after that date.

More information is available from the ITS '84 Symposium Coordinator, Teleglobe Canada, 17th Floor, Marketing Department, 680 Sherbrooke St. W., Montreal, Que., Canada H3A 2S4.

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Field Exercises Successful

Army Puts Electronic Dog Tags Through Paces

By John Gallant
CW Staff

FORT LEWIS, Wash. — The high-technology version of the military "dog tag" has performed like a trooper during exercises designed to test its capabilities in the field.

The 9th Infantry Division, also known as the High Technology Light Division, recently put the microchip version of the standard U.S. Army dog tag [CW, May 16] through its paces during field training exercises here.

During the exercises, code-named Lasermace, some 3,000 of the division's 16,000 troops were issued the so-called Personal Data Tags, which contain a 64K-bit electrically erasable programmable read-only memory chip that can be read by a portable computer.

The tag stores medical, personnel and financial data about a soldier. Similar in size to the older metal dog tags, the tags were used in Lasermace to transfer troop records across units, recall medical and emergency treatment information for "wounded" soldiers and to record "casualties," among other things, according to Maj. Robert Perceval, public affairs officer for the 9th Infantry Division.

Fed Into Terminal

In the field, data from the microchip dog tag could be fed into a portable computer terminal and relayed via a coded FM channel to headquarters, providing military authorities with information on troop strength and location.

The tags are only one component of the 9th Division's prototype High Technology Personnel System, which embraces a variety of technologically advanced products that officials hope will reduce paperwork and manpower requirements for the Army in the future.

The microchip dog tags will undergo more testing next month during a command post exercise codenamed Caberbase. The high-tech military equipment and the modern-day maneuver and logistical concepts developed by the 9th Infantry Division are scheduled to be evaluated fully during a field training exercise named Laserstrike next August. If the Personal Data Tag continues to perform up to expectations, the Army hopes to issue them on a servicewide basis by early 1985.

At Fort Harrison in Indiana, officials recently received the first batch of the 1,600 Personal Data Tags the Army plans to test in peacetime applications here. "The information we put into these tags is pretty standard data about an individual that doesn't change very often. The computer can read it quickly and correctly when a soldier is transferred, and that saves a lot of paperwork and time," said Chris Occhialini, civilian systems manager for the data tag project.

"When we need to see some information about an individual, it will be available on a CRT screen rather than a paper record that has to be maintained and filed," he added.

According to Occhialini, the prototype electronic dog tags are "very expensive" at more than $100 each, but that cost is expected to drop to about $30 when the tags are purchased in large quantities.

Perceval's cost estimate was considerably lower — about $15 — for the dog tags used by the 9th Infantry Division.

If the computerized dog tags are adopted, the Army would need between 2 and 3 million of the tags for all its active, reserve and National Guard personnel, Occhialini estimated.

Occhialini said the Personal Data Tag will be worn in addition to the standard dog tag which, because it is more durable than the electronic version, would remain with a casualty for identification.

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Competitors, Users Decry Proposed AT&T Rates

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — AT&T's proposed rates for dial-up long-distance, Wats and private-line services were lambasted by the company's competitors and customers earlier this month.

In comments submitted to the Federal Communications Commission (FCC), the critics accused AT&T of reducing rates only for the services where it faces heavy competition and charged that the company has passed on only a portion of the savings it will reap from the FCC's access charge decision.

The new rates, which AT&T unveiled last October, are scheduled to go into effect April 3. Most of those who submitted comments said the FCC should impose interim rates on that date while investigating the objections to AT&T's proposal.

"The issue of most immediate concern to users," said the International Communications Association (ICA), a corporate communications users group, "is whether AT&T has flowed through to interstate ratepayers . . . the full amount of its savings resulting from implementation of the access charge plan." ICA contended that "approximately $2.1 billion more of AT&T's projected interstate revenue requirement could be subject to flow-through."

The association also questioned whether AT&T's regulated rate base has been properly valued.

The recent comments on AT&T's pending tariff represent the latest development in the battle over the FCC's access charge decision, under which the present method of reimbursing local telephone companies for the costs they incur in providing access to the long-distance network is to be revised drastically.

Long-distance users alone currently bear these costs through charges included in the bills they receive from their long-distance carriers. Under the new plan, part of the long-distance access expense will be billed directly to all local-exchange users, while long-distance users will continue to pay the balance through their carriers.

AT&T's pending long-distance (technically inter-Local Access and Transport Area [Lata]) tariff is the first one reflecting the latter portion of the new access charge. Also pending before the FCC is a set of tariffs filed by the Bell operating companies and several independent telephone companies that specify what they intend to charge both the long-distance carriers and local network subscribers for long-distance access. Users and other common carriers strongly oppose the Bell operating company tariffs as well as the AT&T filing.

Originally, the FCC access charge decision, together with the local telephone company and AT&T tariffs, were to become effective Jan. 1. But because of the voluminous tariff material filed by AT&T and the local carriers, the FCC ordered a delay.

During that interim period, present rates will continue, but revenues will be divvied up between AT&T and the local companies, according to a plan which they devised and which was accepted Dec. 1 by U.S. Federal District Court Judge Harold Greene, who is presiding over the divestiture of AT&T. A week after this ruling, Greene decided that customers who do not designate another inter-Lata carrier when they place a long-distance call will be routed automatically to AT&T. Since up to 90% of such calls are undesignated, the decision is worth billions of dollars to AT&T.

Wanted: Your Views On Communications Nets

Computerworld is looking for a few good stories on data communications networks. A Feb. 27 Special Report on the subject is now in the making, and contributions are welcome until Jan. 9.

Contributed stories can take two forms: non-product-specific tutorials covering a trend or direction in data communications networks, or case studies of specific users who have solved specific business problems with a certain type of data communications network.

These articles should be between four and six doubled-spaced typewritten pages in length. Authors are encouraged to include any camera-ready art or black-and-white photographs.

Authors should include with all submissions a very brief biography of themselves (name, title, company, city, state) and a telephone number at which they can be reached. Articles should be sent to Jim Bartimo, Senior Editor/Communications, *Computerworld*, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Calendar

Jan. 9-10, Houston — **Automated Base Mapping for Petroleum Applications: Managing Mega Information in the Coming Decade.** Contact: Tom Van Denover, Synercon, 10405 Corporated Drive, Sugar Land, Texas 77478.

Jan. 11-13, Chicago — **Office Automation and Integration.** Contact: Data-Tech Institute, 386 Franklin Ave., P.O. Box 569, Nutley, N.J. 07110. Also being held Jan. 18-20 in Baltimore and Jan. 25-27 in Stamford, Conn.

Jan. 11-13, Washington, D.C. — **Relational Data Bases.** Contact: Software Institute of America, 339 Salem St., Wakefield, Mass. 01880.

Jan. 11-13, Chicago — **Structured Analysis for Users.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Jan. 11-13, Lakewood, Colo. — **Intermediate/Advanced Easytrieve.** Contact: The Seminar Broker, 3212 W. 133 Ave., Broomfield, Colo. 80020.

Jan. 12-13, Orlando, Fla. — **Networking Personal Computers.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940. Also being held Jan. 16-17 in Rochester, N.Y., and Jan. 26-27 in Boston.

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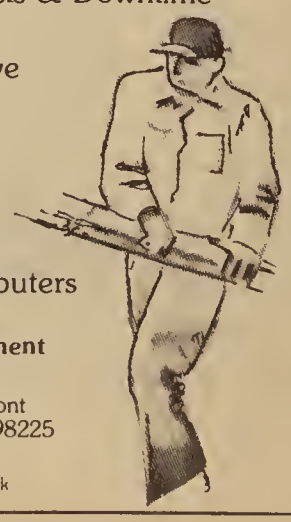

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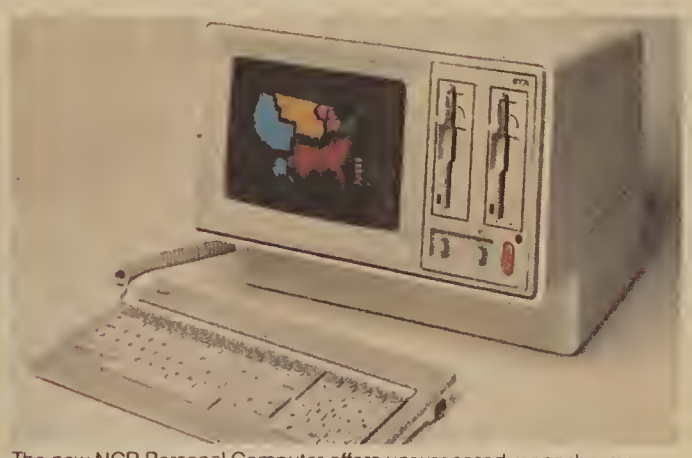

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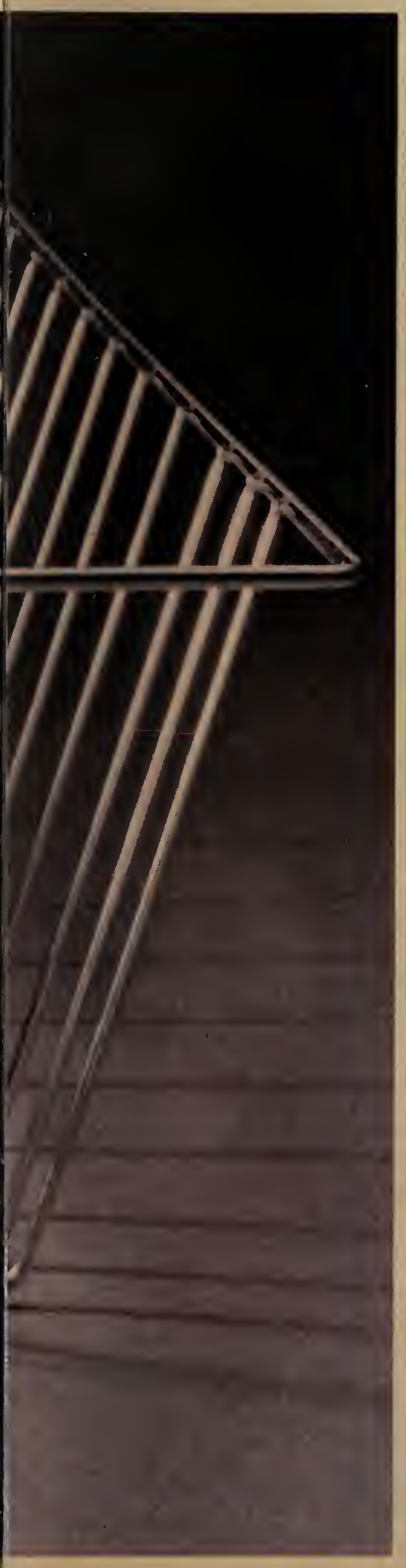

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International Report

FROM THE CW INTERNATIONAL NEWS NETWORK

AUSTRALIA

SYDNEY — Westpac Banking Corp. has announced plans to link up with three major retailers here to create a nationwide network of approximately 1,000 banking terminals. Westpac customers will be able to purchase goods and withdraw cash at Woolworth stores, BP service stations and Food Plus stores by directly debiting their Westpac bank accounts. Analysts here are calling the Westpac announcement an aggressive move in the competitive electronic funds transfer arena.

FRANCE

PARIS — Honeywell Bull-CII has entered the European microcomputer arena with three systems from Honeywell, Inc. — the Mini 6/10 (called the Micro 6/10 in the U.S.), the Mini 6/210 and the Mini 6/290. The first runs under Honeywell's Gcos-400, Digital Research, Inc.'s CP/M and Microsoft, Inc.'s MS-DOS operating systems. It can reportedly emulate the IBM 3270 terminal and offers 512K bytes of random-access memory.

Without printer, the price of a 6/10 configuration is approximately $6,000. The 6/210 and 6/290 are multiuser systems (four and 16 maximum workstations, respectively) based on Gcos. They are priced from $18,000 and $20,000, respectively.

PARIS — IBM France has announced that the Personal Computer XT/370 microcomputer product line is now available for French users. The micro is priced from $4,600.

PARIS — In a move to strengthen its public image, Texas Instruments, Inc. announced that it is "firmly grounded in the minicomputer, microcomputer and terminal marketplace," which represents more than $900 million in worldwide sales and $25 million in French revenues alone. The announcement was delivered at a recent press conference here in the wake of the company's decision to abandon the production of its TI 99/4 microcomputer product line. In France, TI plans to enhance the capabilities on its Professional Computer line with local-area networking and the ability to communicate with IBM configurations.

PARIS — The French software house Serli has introduced a three-dimensional computer-aided design software system based on Victor Technologies' 9000 microcomputer. Called Conception-3D, the product is said to be a true three-dimensional system suitable for architecture, mechanical design and engineering applications.

PARIS — A Frost & Sullivan report just released here indicates that IBM is applying increased pressure on manufacturers of plug-compatible mainframes here. The study said plug-compatible manufacturers must concentrate on market niches and provide better service than IBM in order to survive.

JAPAN

TOKYO — Sanyo Electric Co. will market its personal computer line in the U.S. next year, the company announced recently. The Sanyo Models MBC-550 and MBC-555 can reportedly run software written for the IBM Personal Computer and small business machines and are priced between $1,000 and $1,400.

TOKYO — During the first half of 1983, Hitachi Ltd. attained sales of $8.8 billion, up from $8.2 billion in the first half of 1982. The sales resulted in a net income for that period of $338 million.

SWITZERLAND

ZURICH — The Swiss postal, telephone and telegraph administration announced that it has selected ITT of the U.S. to supply its System 12 digital-switching system for its telephone network. Installation of the digital-switching system will begin in late 1986.

ENGLAND

NEWBURY — A survey of 163 IBM mainframe sites conducted by Xephon Technology Transfer Ltd. found that IBM rates poorly as a software supplier. Out of a field of 21 of the most widely used software suppliers, IBM finished 19th under "product quality" and ranked 20th for "value for money." Users, however, tend to buy IBM software more readily than independent software because of their fears about future compatibility, according to the survey.

WEST GERMANY

MUNICH — In a major joint research and development pact, France's Honeywell Bull-CII, England's ICL and West Germany's Siemens AG have officially announced the establishment of the European Computer Industry Research Center Gmbh here. The three partners plan to concentrate on information technology research, with special emphasis on artificial intelligence.

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Apple Loses Australian Fight Over Look-Alikes

By Peter Bartolik
CW Staff

Apple Computer, Inc. recently lost a round in its international legal battle against the marketing of "fake Apple" microcomputers when an Australian federal judge ruled that Apple II programs contained in read-only memory (ROM) are not protected by Australia's copyright law. Apple reportedly plans to appeal.

The Australian ruling is in direct contrast to a U.S. Court of Appeals ruling earlier this year that affirmed the copyrightability of operating systems and computer programs embedded in ROM [CW, Sept. 12]. That decision overturned a lower court decision which had denied Apple an injunction against Franklin Computer Corp.'s marketing of its ACE series of Apple-compatible computers.

U.S. trade organizations contacted by *Computerworld* last week reacted negatively to the Australian decision, but said they have not yet obtained copies of the ruling.

Oliver Smoot, spokesman for the Computer and Business Equipment Manufacturers Association, said the decision would probably not impact U.S. mainframe and minicomputer vendors who export to Australia and rely on specific contractual agreements and trade secret statutes for protection. But vendors of microcomputers and micro software, he added, have tended to rely on copyright protection and would certainly be concerned.

"There is a serious question about the advisability to market [U.S. products] in Australia," Smoot said. "Certainly they would not want to market something innovative down there until there is some clarification."

The Association of Data Processing Service Organizations, Inc., which filed a brief in support of Apple's U.S. case against Franklin, is "disappointed" by the Australian decision, according to general counsel Ronald J. Palenski. He said the ruling should be a matter of concern for U.S. vendors doing business in Australia, but he doubted it will affect judicial rulings in other countries or the U.S.

"Because the U.S. leads in technology, it also leads in confronting the property law issue," Palenski said. "We have had more court cases, more legislation on the issue, and other countries essentially look to the U.S. [for guidance]." Internationally, he said, "there is not disparity, but [rather] uncertainty" over how to deal with software protection.

The Australian case, filed by Apple Computer Australia Pty. Ltd., is reportedly one of about 30 cases that Apple Computer, Inc. is pressing in foreign countries. Apple's Australian subsidiary had claimed that Computer Edge Pty. Ltd., by marketing Taiwanese-manufactured Wombat microcomputers, was infringing upon copyright protection afforded Apple's Applesoft version of Basic and Autostart ROM, both embedded in ROM chips.

The ruling by Justice Bryan Beaumont in the Federal Court of Australia has sparked concern that the ruling could be applied to applications software because the judge said a program is intended only to assist the functioning of a mechanical device. According to Graham Greenleaf, president of the New South Wales Society for Computers and the Law, the judge in his decision did not acknowledge any difference between operating system software and applications software.

"There is some grounds to believe that he means it to cover all software," Greenleaf said.

Beaumont said the last amendment of Australia's copyright law, made in 1968 and reportedly modeled on a 1956 amendment to British law, did not extend copyright protection to computers, which he said was an indication the legislative intent was that such matters should be covered by other legislation. However, some Australian lawyers have argued that a British parliamentary commission, the Whitford Committee, reported in 1977 that, while no specific reference to computers was included in the British amendment of 1956, computer programs were covered by existing categories of literary work.

This story was prepared with the assistance of David Noble, news editor of Australasian Computerworld.

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Magnuson	M80/30	.24

*COMPUTERWORLD estimates

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EDITORIAL

Welcome to 1984

A recent national poll conducted by Louis Harris has turned up some surprisingly optimistic, yet cautious, observations on how the American public views computers and society.

First, the good news. After randomly interviewing more than 1,000 people — a small number of them corporate executives and legislative leaders — Harris found that computers may have finally overcome the stigma of being coldhearted invaders of privacy. In fact, 88% of those polled feel that computers and automation will actually improve the quality of their lives, despite the scenario presented by George Orwell some years ago when he fictionally peered into his future and our soon-to-be present.

However, a number of those people considered by Harris in its poll to be "nonleaders" — 68%, to be exact — also feel that while computers are their friends, they and, more accurately, the people who use them, cannot necessarily be trusted to preserve privacy and look out for the future of their children. They insist that to be trusted, computers must be tightly controlled and restricted.

However, more than 60% of the corporate and government "leaders" in the poll — people in Congress and school superintendents, for example — disagree with public opinion and are against tight restrictions on the use of computers.

This brings us to the question of who should be given the keys to the convertible on a freewheeling, Orwellian Saturday night: the American public, who wants to keep tabs on every movement, or government lawmakers and industry leaders, who would like to have as few stop signs and red lights as possible.

Certainly, the majority of those polled have a point. Without any restrictions or close scrutiny, computers and their users have the potential for putting a few dents in personal privacy and computer-based accuracy. This apparently was the case at the Illinois Department of Law Enforcement, where it was recently found that 59% of the department's 1.25 million computerized arrest files contained incomplete and, therefore, wrong data. Prosecutors and judges in that state use this data to file charges and make sentencing decisions.

The polled leaders also have a point. For instance, although the computer-based matching and data-swapping programs that have been conducted by federal welfare and other agencies sound unethical, the U.S. Welfare Department has used these techniques to uncover thousands of frauds and to ensure that benefits are given to the right people.

While computers have finally been elevated to the friendly and familiar likes of E.T. and Winnie the Pooh (at least according to Harris), the American public now has an even greater and tougher responsibility. It is not to keep an eye on the object at which everyone has been pointing, but rather to keep an eye on the people who are doing the pointing.

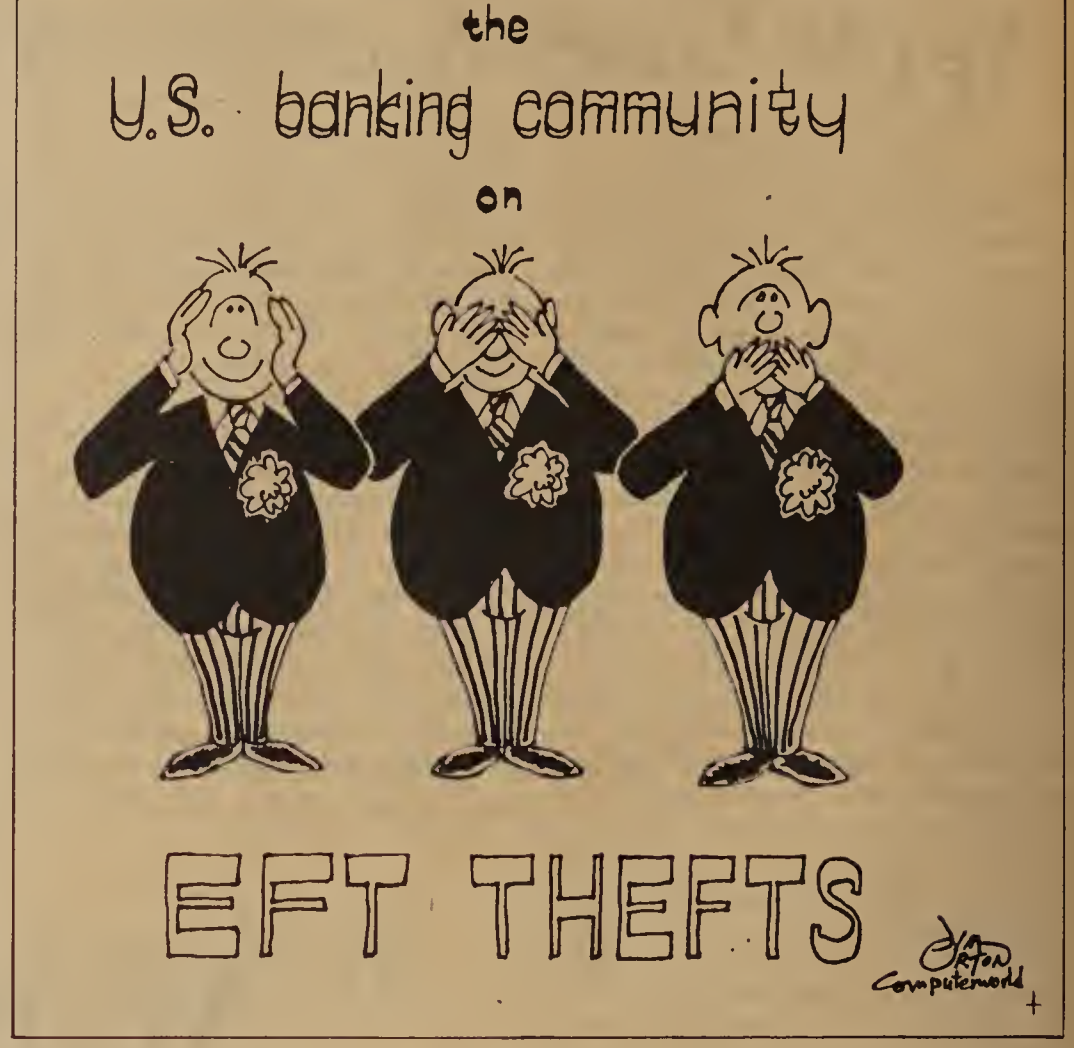
DATA PAST

Five Years Ago
Dec. 18, 1978

WASHINGTON, D.C. — Then-President Carter praised the computer matching techniques used by the Department of Health, Education and Welfare to detect fraud against the government.

Ten Years Ago
Dec. 19, 1973

WINNIPEG, Man. — A keypunch incentive bonus plan was developed here at Gambles Canada Ltd. to encourage employees to increase speed and reduce errors, while improving their earning power.



LETTERS

'What I Meant to Say'

In the article "Where's Cullinet Headed? A Frank Talk With John J. Cullinane" [CW, Dec. 5], I was quoted as saying that Cullinet Software, Inc. "bought [Micropro International Corp.'s] Wordstar." What I meant to say was that Cullinet "bought Finalword from Mark of the Unicorn, Inc."

John J. Cullinane
Chairman of the Board
Cullinet Software, Inc.
Westwood, Mass.

Two Distinct Systems

Robert P. Campbell's In Depth article "Locking Up the Mainframe" [CW, Oct. 10] was quite interesting. Users are becoming more aware of security issues and are placing an increased importance on their systems' ability to provide protection. More articles should be devoted to informing the user community of alternatives to protecting their information.

However, I am concerned that the article may be misleading. The specific reference to the Honeywell, Inc. Multics system is inaccurate. Campbell has confused the two separate and distinct systems offered by Honeywell: Multics and Gcos.

The specific evolution Campbell has identified was the adaptation of the Gcos operating system for the World Wide Military Command System. Software modifications and enhancements were made to Gcos both to enhance the security as well as to provide specific new functions as required by the government. Penetration may or may not have been completed as indicated by Campbell.

The Multics operating system did not evolve from Gcos in the manner described in the article. Multics was developed from an original design effort by a team from Bell Laboratories, General Electric Co. and MIT in the early 1960s. The hardware utilized for the early development effort was an offshoot of the same hardware used for the Gcos evolution; however, both operating systems were developed independently.

As Multics was developed, the need for hardware enforcement of the original security design goals required modifications to the hardware, and a new system came into existence. The hardware system, now designated DPS 8/70M, is significantly different from its distant cousin, DPS 8/70, on which Gcos will execute. Multics will not execute on the Gcos DPS 8/70 hardware.

Multics is currently being used at several government installations. The U.S. Air Force data services has used a tiger team to investigate the security of Multics. The team did penetrate Multics while investigating an early release of the operating system.

However, over a year of effort was required with a full listing of all operating system code available. As soon as the security breach was identified, the problem was corrected, and no further successful penetrations have been identified.

Both the U.S. and Canadian governments have designed systems utilizing Multics, on which classified information is being maintained. Their analyses and subsequent uses of Multics indicates an acceptance of the security protection offered by Multics.

No system is totally secure, given an infinite amount of time and resources. However, I am amazed that Multics is not given the recognition it deserves. Multics is a commercially available system and should not be overlooked by users who are seriously concerned about system security.

Robert J. Grimes
Senior Computer Consultant
RG Consulting
Phoenix, Ariz.

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1. BUSINESS/INDUSTRY (Circle One)
End Users
10 Manufacturer (other than computer)
20 Finance/Insurance/Real Estate
30 Medicine/Law/Education
40 Wholesale/Retail Trade
50 Business Service (except DP)
60 Government—State/Federal/Local
65 Public Utility/Communication Systems/ Transportation
70 Mining/Construction/Petroleum/Refining
75 Other User_____
Vendors
80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/ Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor_____

2. OCCUPATION/FUNCTION (Circle One)
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
22 Director/Manager of Operations/Planning/ Administrative Services
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
35 OA/WP Director/Manager/Supervisor
38 Data Comm Network/Systems Mgmt
41 Engr/Scientific/R&D/Tech Mgmt
51 Mfg Sales Reps/Sales/Marketing Mgmt
60 Consulting Mgmt
70 Medical/Legal/Accounting Mgmt
80 Educator/Journalist/Librarian/Student
90 Other_____

3. COMPUTER INVOLVEMENT (Circle all that apply)
Types of equipment with which you are personally involved either as user, vendor or consultant
A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

READER COMMENTARY/Richard Carter‡

'Twas the Week Before Christmas

'Twas the week before Christmas
And all thru Tech. Supp.
Not a phone bell was ringing,
Not a system was up.

My keyboard was silent
In a "NOT POLLING" state;
I had a blank screen
On my 3278.

The manuals were sitting
Straight up on the shelves
In hope they'd be stolen
By demented, old elves.

And I in my office,
My face in my hand,
Had just blown the system
With an "SPQ COMMAND."

The users were roaming
Outside near their bins,
Gazing thru windows
At the system within.

They saw thru the glass
What a programmer dreads:
The printers were ripping
Their output to shreds.

The console was blurred
By vague moving shapes
While tape drives digested
Some Master-File tapes.

Operations was frantic
And Systems was screaming:
"Our CE's at lunch,
(Or off somewhere dreaming)."

Then Management came
And learned of our fate
Once again caught
In a Downtime Stalemate.

"What can we do?"
One boss moaned in stress.
"I wish we had someone
To fix up this mess."

Then all of a sudden
From outside the door
We heard a great crash
And dived for the floor.

And then to our eyes
Appeared a great sled
And inside, an FE
(Who was dressed all in red).

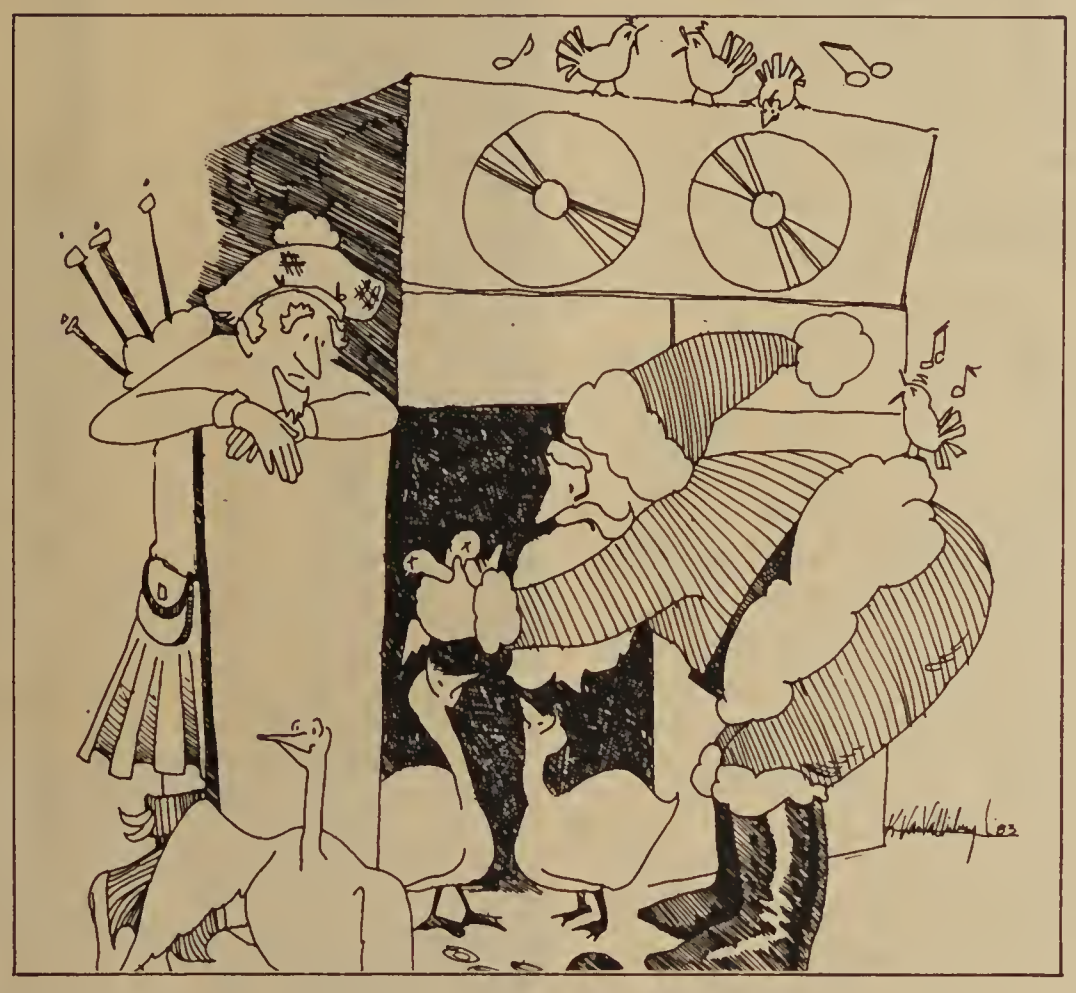
He was covered with ink
From his head to his toe
And commented loudly
"I wish it were snow!"

He was not very tall
And more chubby than thin;
His nose matched his clothes
And his face wore a grin.

He set right to work
Knowing just what to do
And he didn't stop once
Until he was through.

He pulled from the units
The strangest of things,
From four calling birds
To five golden rings.

He cast out the items,
Piece after piece,



And one of us fainted
When he pulled out six geese.

He said not a word
Except for some griping
'Cause he had to extract
Seven pipers piping.

He gave out a groan
And removed his black gloves,
Then reached right inside
And removed two squashed doves.

Debris filled the room
Right up to the doors
'Till he slammed shut the units
And said "It's all yours!!"

We looked at each other
And said "What the hell?"
Then pushed the blue button
That said "IPL."

We heard a few clicks,
A groan and a glupp,
And wouldn't you know,
The damn thing came up.

The FE just stood there
With a smile on his face.
As fix-it men go,
This guy was an ace.

He packed up his tools
And mounted his sleigh,
Stuck his thumb in his nose
And went on his way.

We watched as he flew
Off into the night
Until in the dark
He vanished from sight.

Yet we heard him exclaim
And it was sort of dim,
"Merry Christmas to all,
But don't call again."

Carter is employed in the engineering technical support department at Stone & Webster in Boston.

HUMAN CONNECTION/Jack Stone‡

IBM Micro Clones a la 'Cabbage Patch Kids'

The "Cabbage Patch Kids" phenomenon has much greater significance beyond that of merely being the latest rage for gristling the media mills at this time of the year. Indeed, Cabbage Patchism is a quasi-revolutionary product development strategy that finds application throughout human enterprise in the industrialized free world.

I presume that by now you are aware of the basal mechanism employed by Coleco Industries, Inc., the vendor: A gaggle of automatic randomizers makes certain that the various components and subassemblies of the kids' systems constitute, in fact, unique combinations.

In this way, the end recipient is made to feel that the ever-so-slightly modified kid clone is very specially his, a matter attested to by "adoption papers."

The doll industry generates, of course, a substantial hunk of our national wealth, and all of us should applaud the brilliance of Coleco in contributing to our economy in such an enlightened way.

Even more important to DPers is that Cabbage Patchism has the potential for generating unique IBM Personal Computer clones, which, though functionally equivalent to Big Blue's offerings, are tailored to the individual needs of users.

Personal Computer Mart

Just think of the impact these items would have on the personal computer marketplace:

- Buyers would no longer have to settle for the drab eggshell-colored plastic that encases much of the machinery around these days.

Instead, they could order accent panels outfitted with a variety of stripes, solids, herringbones, simulated woods or even Middle Eastern rug patterns.

Of course, swatches of material from the ancillary furnishings of the computer room would have to be forwarded along with the order form to assure complementary matches, which should not be a terrible inhibitor for the purchasers who will go to great lengths to assure that the gestalt of the machine reflects their personalities and life-styles.

- Taking a lead from the newly announced talking cameras, the vendors could install a voice synthesizer unit to generate system messages in place of textual displays.

For example, the male users will be able to order voices tailored to their tastes — like those of Katherine Hepburn, Morgan Fairchild or Brooke Shields, depending on the generational time slot — and fantasize over cooing tones that softly note, "I'm your main menu. Make your choice, any choice."

And female counterparts will have heartthrobs such as Burt Reynolds or Clint Eastwood whisper that "storage on Drive C is exhausted."

- "Window" options will be available to allow for split-screen display not only of two to eight data files simultaneously, but also family-rated movies that the operator can enjoy while waiting for the interminably slow-speed sorts that are so common on personal computers.

Then, too, we can be certain that the independents will find ways to design boards for unused slots that will permit the display of X-rateds.

- There would be a total integrated electronic system alternative in which the computer is packaged along with a comprehensive array of stereo and video components.

Not only would these components be controlled through the computer keyboard, but the user who is really into dynamite experiences could process and record digital signals from the microframe on the stereo/video gear for subsequent playback.

Maybe I'm old hat because I'd bet that the results would not be much better than the rock 'n' roll stuff that clutters the airwaves today. But at any rate, the effects would be novel, even, perhaps, mind blasting.

I'm not altogether certain about the global practicality of Cabbage Patchism as a vehicle for customizing personal computers, but it seems to me that, given the spirit and imagination of American computer-driven entrepreneurs, Cabbage Patchism someday will be an important factor in our marketplace, let's hope less of a fad than the Cabbage Patch Kids.

For you and your family, a joyous holiday season and a prosperous new year.

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ShowIT™: graphics and drawing program.
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Financial Modeling: Look Before You Leap

By Len Bergstrom
Special to CW‡

The rapid growth of the financial modeling software market has presented buyers not only with a wealth of opportunities, but also a healthy dose of confusion. To make an intelligent choice, businesses must first define which features are important. In this first part of a two-part series, Len Bergstrom defines some of the criteria you should establish before investigating the alternatives.

At the beginning of the decision process, it is essential to establish your personal criteria first. Users are often overwhelmed by vendor claims or swayed by an emphasis on sophisticated features that they cannot use. No system is the best for all financial modeling requirements. By starting with an analysis of the needs of your company, you can screen out those vendors who are obviously overqualified and underqualified.

To establish individual criteria, create a profile of your company to delineate general and specific requirements in several key areas. This is often done by performing a user survey or, when possible, involving key end users in the actual decision making.

High on the list of important considerations are the company's personnel characteristics. Your company profile should specify departments involved and their degrees of participation. End users should be surveyed to determine their levels of programming proficiency and experience with programming and financial modeling languages. Finally, investigate the styles of operation — the types of models, levels of sophistication, degrees and frequency of change and ad hoc needs.

Determine the exact type of modeling and reporting capabilities required. Model characteristics such as size, number of accounts and time periods, level of detail and summation can be addressed. Review how different models communicate with each other for corporate planning, division planning and unit planning. Critical issues include the availability of financial, statistical, forecasting and user-defined functions and subroutines, as well as how the sys-

(Continued on Page 30)

Allows Integration of Methodologies

Nastec Introduces Tool for Case 2000

SOUTHFIELD, Mich. — Nastec Corp. has introduced the Lifecycle Manager, a software package that allows various conventional methodologies and design tools to be integrated on the company's Computer-Aided Software Engineering (Case) 2000 workstation.

Case 2000 is a desktop unit consisting of an Intel Corp. 8086 microprocessor with up to 1M byte of memory and a real-time multitasking operating system. The workstation offers host communications links with IBM mainframes via IBM 2780 or 3770 remote job entry and 3270 emulation capability.

Graphitext: Nastec Corp.'s design and documentation editor

The system includes limited word processing functions and a graphics package that allows flowcharts to be created and manipulated.

Lifecycle Manager operates in a clustered configuration of Case 2000 workstations to provide identification and selection of the steps required for project execution, estimation of resources and budget, assignment of individual work steps, generation of menus, execution of work steps and verification of their completion, on-line Help screens and quality reviews.

Lifecycle Manager is said to enable management to plan and control the life cycle methodology by enforcing performance standards, allowing con-

(Continued on Page 28)

Comshare Adds Filing, Window To 'System W'

ANN ARBOR, Mich. — Comshare, Inc. has announced filing and window capabilities for its System W decision support software.

Filepower reportedly brings data into System W applications from varied computerized format sources. It is said to increase productivity by accumulating incoming detail data to the level wanted for modeling purposes.

Window reportedly allows full-screen data entry, editing and viewing of any spreadsheet from a System W model data base.

System W is available for IBM VM/CMS and MVS/TSO operating systems. Prices for System W, including Window, range from $55,000 to $100,000. The price for the Filepower option is $5,000.

Comshare is located at 3001 S. State St., Ann Arbor, Mich. 48106.

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STAR

Price Increase Announced For Release 3.0 of 'Test/IMS'

DOWNERS GROVE, Ill. — Consumer Systems Services Group, Inc. has announced a price increase for Release 3.0 of its Test/IMS software testing tool for the native IMS environment.

Release 3.0 of Test/IMS, which the company said is scheduled for release during the first quarter of 1984, will be distributed to all current users at no cost. Through Jan. 31, Test/IMS will be priced at $16,000 for perpetual license. It will be priced at $21,000 after that date.

The package was designed as a testing tool that provides diagnostic information on IMS programs while testing within the native IMS environment. Facilities within the package reportedly provide users with a means of checking application program logic, IMS interfaces, teleprocessing activity and data base activity.

Enhancements offered with Release 3.0 include the ability to change dynamically (from a terminal) any Test/IMS diagnostic option, the ability to choose the type of dump desired, the capability to measure standard work-unit variances and the ability to save on-line output for printing.

Test/IMS is available from Consumer Systems, 1100 31st St., Downers Grove, Ill. 60515.

Time Deposit System Debuts

ALPHARETTA, Ga. — Optimum User Software Corp. (Opus) has announced the Time Deposit System which is said to give bank customer service personnel control over processing all types of deposits.

Designed for use in IBM's CICS-VS environment, the real-time system reportedly uses self-prompting screens enabling the terminal operator to process new accounts, deposits, redemptions and customer inquiries without referring to paper documents or making calculations. All transactions are immediately edited and posted when entered at branch or correspondent banks.

The vendor said that by defining a new investment instrument's "profile" to the system, each bank can react to changing regulations or competitive conditions. The system also offers book-entry processing, which reportedly eliminates the need to control and maintain legal documents for Certificates of Deposit. The package also features Internal Revenue Service withholding and Individual Retirement Account reporting, multibank processing and automatic general ledger entries.

The Time Deposit System is priced at $97,000 from Opus, 765 Rio Grande Drive, Alpharetta, Ga. 30201.

'Probe' Package Introduced For System/38

WHEELING, Ill. — Advanced Systems Concepts, Inc. has announced Probe, an interactive analysis and cross-referencing package for the IBM System/38.

According to the vendor, Probe uses object- and source-code-level analysis to provide cross-referencing information. The analysis is performed in a batch subsystem, and the information is provided on-line. The package reportedly is menu driven and will display job stream explosions. It shows all control transfers from one program to another and provides flowcharts.

The package is said to provide on-line data base information, including record layouts for externally described files and RPG and Cobol program described files. Probe does field analysis and can display program usage of field information for internally and externally described files, allowing users to determine which programs are using a specified field.

Reference field analysis and physical and logical file dependencies can be displayed through the package, and file "where used" displays and explosions are included.

Probe is available for a one-time license fee of $1,000 from Advanced Systems Concepts, 1084 Cornell, Wheeling, Ill. 60090.

Nastec Adds Tool For Case 2000

(Continued from Page 27)

sistent reviews of the different phases of the software process and providing facilities for financial measurement and control.

It enables in-house software development standards or commercial methodologies to be used for a structured approach to programming. Views of projects already completed and future tasks are available. Related materials, such as instruction, are part of the information provided.

The price of one workstation, including 384K bytes of memory, high-resolution monitor, operating system and foundation software, is $15,000. Lifecycle Manager has a one-time sales price of $26,000, which includes use on one existing workstation plus 40 hours of consultation and training. Additional workstation licenses range from $500 to $3,000 each.

Nastec is at 24681 Northwestern Highway, Southfield, Mich. 48075.

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ADR Introduces Graphics Support For Query System

PRINCETON, N.J. — Applied Data Research, Inc. (ADR) has introduced interactive color graphics support for its ADR/Dataquery relational query system.

According to the company, Dataquery's interactive graphics facility condenses data from a company data base into pictures.

Designed for use with IBM 3278 video, 3279 color video and 3287 hard-copy printers and IBM CICS using IBM Graphic Data Display Manager graphics, Dataquery reportedly allows a user to select report information from a menu and request a graph.

It was designed to produce six basic graph types, including bar charts, line graphs, pie charts, surface charts, scatter diagrams and histograms.

Other presentation options are said to include color selection, horizontal and vertical grid selections, chart headings, axis titles, movable key boxes and multiple charts per page.

The permanent-license price for the graphics option is $8,000 for IBM OS environments and $6,000 for DOS environments.

The permanent license for Dataquery is $18,800 for OS and $14,600 for DOS from ADR at CN-8, Rt. 206 and Orchard Road, Princeton, N.J. 08540.

Boeing Enhances Its RIM DBMS

VIENNA, Va.— Boeing Computer Services Co. (BCS) has announced that it has enhanced its BCS RIM data base management system (DBMS) offering to include a report writer and other additions including links to personal computers using Microrim software.

BCS RIM Version 6.0 reportedly lets the user utilize the report writer to organize and display data involving employee records, budgets, structural analysis and design and project management.

The report writer features layout directives for controlling output appearance, user-specified print breaks, multiple-relation reporting and alternate sort sequencing.

Offered for scientific and engineering applications, BCS RIM Version 6.0 reportedly allows data to be entered and edited on a micro and transmitted to a mainframe and lets portions of the data base be downloaded from a mainframe to a micro for local processing.

Available now, Version 6.0 is a Fortran-based product supported on operating systems that include Digital Equipment Corp.'s VMS, Control Data Corp.'s NOS, IBM's VM/CMS and Cray Research, Inc.'s COS.

The data base is priced at $7,500 and the report writer at $2,500.

More information is available from Boeing Computer Services, CV86, 7980 Gallows Court, Vienna, Va. 22180.

Choosing Financial Modeling Software

(Continued from Page 27)

tem handles complex computations, lead and lag periods, automatic reordering of equations and solution of simultaneous equations.

It is important to view several different aspects of reporting needs. The extent of periodic needs for reports must be evaluated in terms of degree of repetition, formal procedures, multiple usages and volumes. Consider whether custom and standard reports are available and whether the reports will be for presentation or information needs. Consider the origin, size, type, frequency and immediacy of ad hoc reports and graphs. Finally, the current approach to these modeling and reporting problems is critical.

Data management is assuming more and more importance. Does your company require access to external data bases? Are there any specialized requirements for market or geographic data? Financial modeling systems differ greatly in the way they communicate with external data bases.

Amount of Data

Also, the amount of corporate data varies substantially according to the number of items and historical periods, the types of data, the overall volume and significant digits. The frequency, source and means of capture and update operations have to be identified. Finally, size up the system's ability to transfer data and the characteristics of retrieval and reporting. Determine frequency of access, degree of screening, purposes of data and types of users.

Special needs also deserve some thought. Network locations can be identified for interaction of terminals, local dial access, sales and technical support coverage. International network needs, consolidations, currency exchange rates and common applications play a role. The presence of analysis capabilities can also be vital.

Documentation, training, hot line, application models and consulting availability should figure in your evaluation.

Lastly, review current service contracts for terms and conditions, amount of usage, types of applications and degree of satisfaction. The last question to be asked is where will the system be used? In-house computer facilities may be a significant factor in the decision process.

Bergstrom is a principal and vice-president of consulting services for Real Decisions Corp. in Stamford, Conn.

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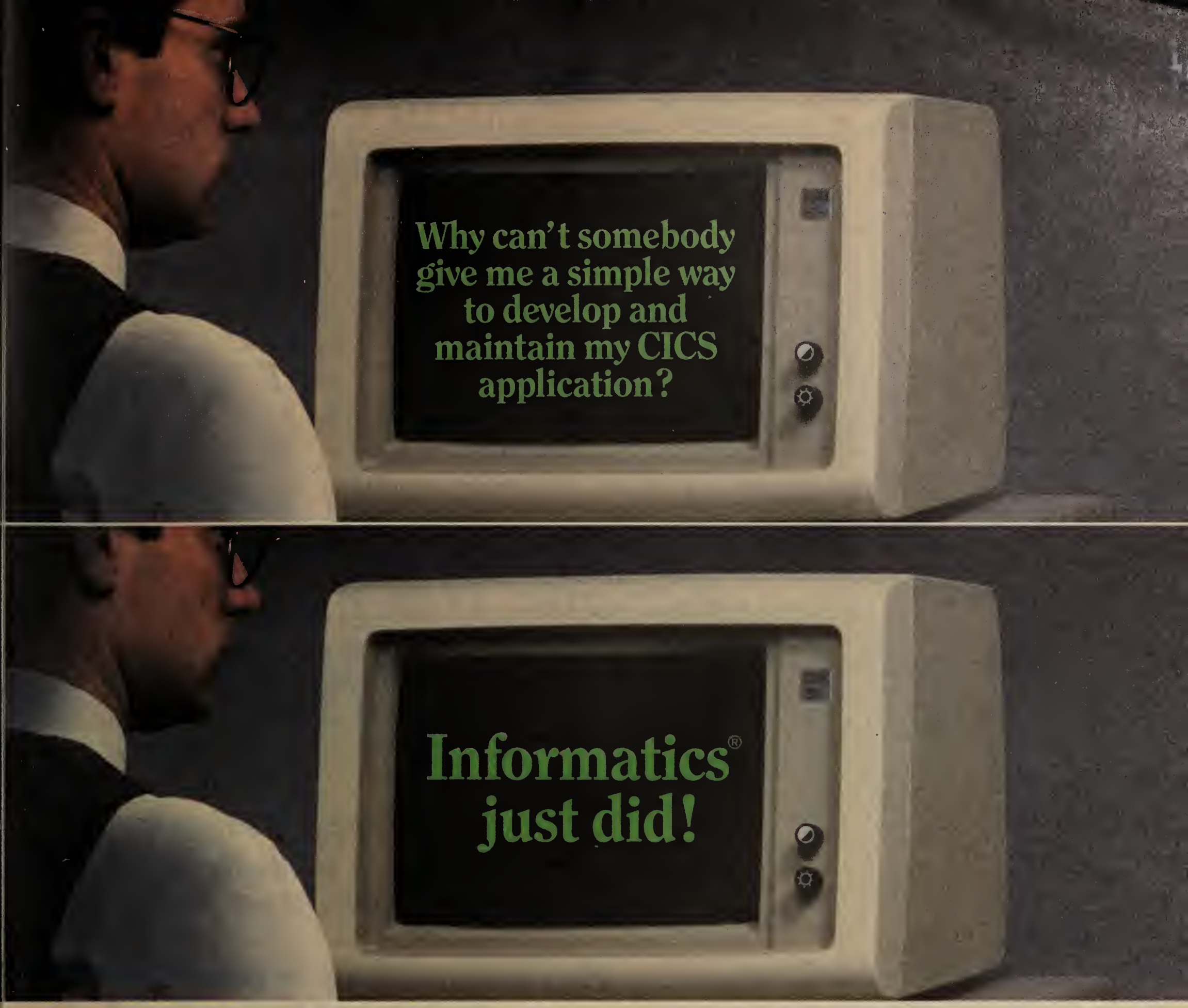

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CW/AE

On-Line Support System Out

DALLAS — Hogan Systems, Inc. has introduced an on-line customer support system that allows access with the firm's mainframe computers based here and with IBM Personal Computers at the customer's site.

The Hogan Interactive Telecommunication System (Hits) can reportedly be accessed from any location 24 hours a day. The customer can transmit batch, on-line and screen questions directly to Hogan's support center here by dialing the telephone number through his Personal Computer and using appropriate security methods for access. Hogan's customer support staff can transmit solutions immediately, the vendor said.

In most cases, the Hogan customer support representative can view the exact documentation the customer is viewing within three minutes. An electronic mail capability allows anyone using Hits to send messages to any other person within the net.

The information data base provides clients with access to an abridged version of Hogan's change control system, which keeps track of current updates, a spokesman said. It also contains installation information, examples, tips, product announcements, upcoming events and education class schedules.

The Hits system costs an annual fee of about 2.5% of the user's software investment, plus telecommunications connect charges.

More information is available from Hogan Systems at 5080 Spectrum Drive, Dallas, Texas 75248.

'Valu Lib' Update Released For IBM 4300s, Series/36

CHERRY HILL, N.J. — Value Computing, Inc. has announced Release 5.0 of Valu Lib, its tape library management system for IBM 4300 series and Series/36 mainframes. The new version reportedly includes additional options for cataloging data sets, more detailed movement and location facilities for tape volumes and enhanced security functions.

The system is said to allow users to delete data sets from the system catalog, maintaining consistency between Valu Lib and the catalog. Other features enable the user to check the catalog when scratching data sets, to extend retention of data sets found in the catalog and to create an auxiliary catalog.

The company reported that the tape movement facility has been expanded to enable users to assign bin or slot number to tape volumes and to flag bins as available for a new tape when a tape is moved.

Security capabilities reportedly have been expanded by having the system send a 44-char. data set name to the security system.

Valu Lib Release 5.0 is scheduled for release in the first quarter of 1984 at a purchase price of $20,000 or on a 12-mo lease at $1,834/mo.

Value Computing is located at 498 N. Kings Highway, Cherry Hill, N.J. 08034.

'MAD' Provides Documentation For HP 3000s

KELLER, Texas — Related Computer Technology, Inc. has introduced the Multilingual Automatic Documentor (MAD), a system that provides documentation of programs written in either Fortran, Cobol or Basic languages for users of Hewlett-Packard Co.'s HP 3000 computers.

MAD is menu driven and allows complete or partial documentation as required. The system delivers program listings and flowcharts along with a cross-referenced list of variables, the vendor said.

The price is $4,995 from Related Computer Technology, 154 S. Main St., Keller, Texas 76248.

Lucasfilm Unveils Logic Design System

SAN RAFAEL, Calif. — Lucasfilm Ltd., through its Computer Division, has announced the Cadroid software package, a logic design system that reportedly takes the designer from schematic entry through prototype board layout and wire list generation at the desktop.

Written in the C programming language, the software runs under the Unix operating system on most Motorola, Inc. 68000-based microcomputers with bit-mapped displays and on the Digital Equipment Corp. VAX-11.

Prices start at $8,000 from Lucasfilm through P.O. Box 2009, San Rafael, Calif. 94912.

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Simulation System Out for VAX-11

HOBOKEN, N.J. — Advanced Systems Concepts, Inc. has announced its Performance Simulation System (PSS), designed to record and replay terminal sessions for the Digital Equipment Corp. VAX-11 family of computers.

PSS reportedly assists with performance testing, application reliability and security by monitoring and playing back I/O of terminals using DEC's VMS terminal class driver.

Replay and editing of the input log reportedly allows large terminal and/or transaction loads to be performed while not requiring significant manpower and terminal resources.

Output of the simulated terminal session is captured during the replay, providing a mechanized means of verifying an applications reliability by comparing the original output log to the playback output log, a spokesman said.

The system is now available at a licensed price of $4,995 for the VAX-11/780, $3,495 for the VAX-11/750 and $1,995 for the VAX-11/730. Advanced Systems Concepts is located at 22 Hudson Place, Hoboken, N.J. 07030.

Tool Monitors System/38 Users

VANCOUVER, B.C. — Chakra Systems International has announced software that reportedly allows system operators to monitor and control terminals on the IBM System/38.

GO/38 allows the system operator, on interactive display, to see the user of every terminal and to know the menu and program the user is on and the time the program was entered.

The data reportedly can be recorded to a data base file for later analysis or can be used either to lock a user to a menu at the next return to the menu or to interrupt the job and force the user back to the menu.

GO/38 is now available in English and French. It leases for $700 per year. Chakra Systems International is located at 8465 Victoria Drive, Vancouver, B.C., Canada V5P4A8.

Firm Updates Pricing Scale For Ross/V

LEXINGTON, Mass. — Evans Griffiths & Hart, Inc. has introduced a new pricing scale for its Ross/V software package.

The vendor's Digital Equipment Corp. RSTS/E Operating System Simulator under IBM's VMS operating system is being newly offered at $7,700 for a DEC VAX-11/750 and at $5,500 for a VAX-11/730. The price will remain at $10,900 for a single-CPU VAX-11/780 license.

Written in VAX-11 Macro, Ross/V provides a way to develop RSTS/E applications on the VAX, a spokesman said. Ross/V supports a subset of RSTS/E monitor calls, standard RSTS/E features, the "hidden" RSX run-time system, resident libraries, job spawning and detached jobs.

The vendor is located at 55 Waltham St., Lexington, Mass. 02173.

Library System For Industry Targets HP 3000

SAN ANTONIO, Texas — Ernst & Whinney has announced its library of oil and gas industry financial and management information packages for use with Hewlett-Packard Co.'s HP 3000 processors.

The information in the library reportedly helps to identify profit improvement opportunities in producing operations, monitors actual results against capital and operating budgets and focuses on tax-saving opportunities.

The Oil and Gas Accounting and Information System package is said to help operators fulfill reporting requirements. The Nonoperator/Investor Accounting System provides income tax and Windfall Profit Tax information.

The Oil and Gas Accounting and Information System is priced between $45,000 and $90,000; the Land and Lease Management System is priced at $20,000; and the Winplan package has a $5,000 license fee. All include training. The Nonoperator/Investor Accounting System is available on a service bureau basis for $6,000 per 120 connect hours from Ernst & Whinney, 1900 Frost Bank Tower, 100 W. Houston St., San Antonio, Texas 78205.

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Financial Tool Gets Upgrade

SCHAUMBURG, Ill. — Outlook Software, Inc. has announced upgrades to its financial modeling package for the IBM System/38. The new version of Outlook/38 reportedly allows a maximum modeling size of 10,000 rows by 10,000 columns, automatically generated models, an unlimited number of models and an automatic model directory.

The software is also said to allow conditional consolidations and up to 1,000 different report formats for a single model, with the formats stored in a menu format.

The package costs $2,850, and a direct file access option costs $500 from Outlook Software, Suite 117, 1 Woodfield Lake, Schaumburg, Ill. 60195.

Graphics Aid From Cortex

'Edds' Added to Strategic Library

WELLESLEY, Mass. — Strategic Information and Cortex Corp. have announced that Cortex's Executive Data Display System (Edds) software has been integrated into Strategic Information's banking business library.

Cortex's Edds system is said to be a full-color presentation graphics package which runs on Digital Equipment Corp.'s VAX-11 system in the DEC VMS operating system environment. Edds will reportedly interface with Tabs, Strategic Information's bank financial statement modeling and forecasting system; its Tab-M asset liability management system; and Bankmaster, its financial management system.

Cortex's Edds package is said to feature 13 lettering styles, including gothic, script, roman and italic, for production of presentation-quality graphs, charts and text. The package reportedly transforms data entered either from a terminal or from standard data files for use in multicolor line plots, high-low-close plots, scatter diagrams, horizontal or vertical bar charts, pie charts and standard text.

Edds is priced at $6,000, according to the vendor. More information is available from Cortex at 55 William St., Wellesley, Mass. 02181.

DEC Offers Accounting System

MERRIMACK, N.H. — Digital Equipment Corp. has introduced the Digital Accounting System, an integrated system designed for small businesses. The system was designed specifically for use on the Decmate II small business computer utilizing a 10M-byte Winchester disk.

The general ledger accounting system handles up to 13 accounting periods or can be used with accounts receivable, inventory control, accounts payable or payroll. Posting of ledgers, financial statement preparation and book closings are integrated, a spokesman said.

Individual accounting modules cost $650, and the sales analysis module starts at $325 from DEC, Continental Blvd., Merrimack, N.H. 03054.

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Concurrent CP/M Receives Generic Version

LAS VEGAS — Digital Research, Inc. recently announced at Comdex/Fall '83 a generic version of its Concurrent CP/M operating system for products based on Intel Corp.'s 8086 and 8088 microprocessors. The generic version of Concurrent CP/M operates with the IBM Personal Computer and is equally suitable for single- and multiuser configurations, according to Digital Research.

The OEM version of Concurrent CP/M works with the software publisher's DR Soft/Net package. DR Soft/Net reportedly allows assorted models of CP/M-based personal computers to be tied together through any local networking scheme, including Xerox Corp.'s Ethernet and Datapoint Corp.'s Arcnet, the vendor said.

In other Comdex-related product moves, Digital Research announced a compiler technology that will reportedly permit existing application software to be transported between different vendors' microprocessors without extensive reprogramming. In its initial version, available in January, the technology will be available as a compiler for Fortran 77, Digital Research said.

The vendor also used Comdex to introduce a family of application software packages that purportedly allow a wide variety of 8- and 16-bit systems to create presentation graphics and emulate a graphics terminal. In addition, the software family includes a program that enables charts and graphs to be generated on the IBM Personal Computer.

The generic version of Concurrent CP/M and DR Soft/Net will be packaged together and will become available next March at OEM-negotiated prices. The three graphics packages range in price from $295 to $500, compared to $500 for the Fortran 77 compiler.

Digital Research is at 160 Central Ave., Pacific Grove, Calif. 93950.

Works With 370, 4300, 30 Series

IBM Unveils Change-Dispensing ATM

RYE BROOK, N.Y. — An automated teller machine (ATM) said to dispense exact change to the penny, cash paychecks and accept check deposits without deposit slips or envelopes was announced last week by IBM. The ATM cannot be left unattended as it is not physically secure.

The IBM 4730 Personal Banking Machine can dispense pennies, nickels, dimes and quarters and bills in five denominations. Designed for use in banks, stores and work locations, the unit also provides the usual ATM functions, including account transfers, payments, deposits and withdrawals.

In supermarkets and other stores, it can authorize personal checks for acceptance at checkout counters, an IBM spokesman said.

Users of the 4730 can cash payroll, Social Security and other third-party checks made out for uneven amounts. The user inserts a banking card, keys in a personal identification number and places the check directly into the check deposit slot.

The 4730 identifies the check by scanning its magnetic characters. The identification number and the amount of the check are entered through the keyboard and are transmitted to the bank's host computer where they are verified. If the request is authorized, the exact amount is dispensed in bills and coins.

When a currency cartridge becomes empty, the 4730 can dispense the correct amount of change using the next lowest denomination of bills and coins, an IBM spokesman said.

All personal ID numbers transmitted from the ATM to the host are encrypted. In addition, messages with sensitive data are tagged with a special code. When the 4730 receives authorization from the host, the terminal verifies that the code was not modified during transmission. Any tampering will change the code, and the terminal will not complete the transaction.

The IBM 4730 Personal Banking Machine can dispense bills and coins.

The ATM will be available in one- or two-console models and can be installed free-standing, in a teller/cashier counter or by a wall. The terminal has a 480-char.,

(Continued on Page 36)

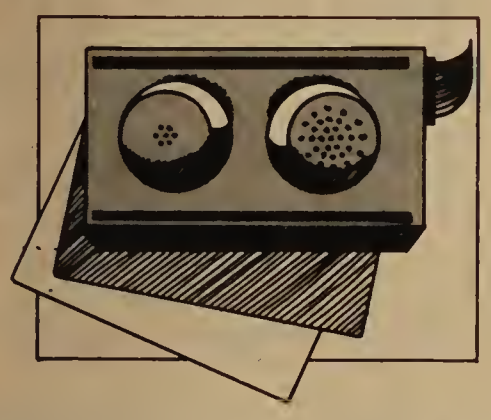
Modem Market Seen Fueled By Integration

Second in a Two-Part Series

By Jean-Pierre Cahier

Special to CW‡

Although certain studies indicated a possibility of a shrinking modem market at the end of the decade, the most recent predictions seem to unanimously agree on the sustained growth of the modem industry. The main argument is the anticipated explosive growth of dis-



tributed information processing and of new networking applications.

Another argument is of an economic and technological nature: Integration of an increasing number of modem functions into a single chip will decrease modem prices, which, while lowering manufacturers' per-unit profits, will attract many more new customers.

Single-circuit integration has already

(Continued on Page 38)

Teleray Adds Ansi X3.64 Unit To Smart Editing Terminal Line

MINNEAPOLIS — Teleray, Inc. has announced the addition of a new Ansi X3.64 terminal, the Model 7-DEC, to its smart editing line.

The dual-mode, multipage unit is 100% software-compatible with the Digital Equipment Corp. VT102 in one mode and the Teleray Model 10-compatible or user-definable (code-loadable) terminals in the other. Either of these resident control modes can be chosen from the keyboard.

With its extended Ansi code set, the Model 7-DEC performs all operating functions of the VT102 plus text editing, programmable function and block transmission operations, according to the company. It has two pages of display memory, either volatile or nonvolatile, which can be expanded to four pages. Its display memory can be reformatted by redefining logical line length and page length.

The 7-DEC's function and numeric pad keys total 32 keys, or 64 functions. They may all be redefined by the user to be compatible with DEC or any other system.

The list price is $1,370, with delivery within 30 days. More information is available from Teleray at 6425 Flying Cloud Drive, Eden Prairie, Minn. 55344.

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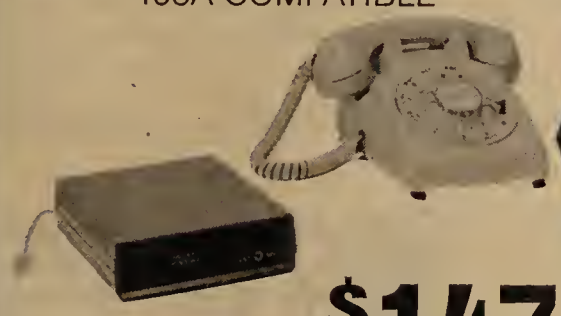

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Modular Private Branch Exchange Offered

SHELTON, Conn. — Tie/Communications, Inc. has introduced a digital modular private branch exchange (PBX) said to combine key telephone operations with the capacity of a medium-size PBX.

The Mercury PBX is reportedly targeted at the 200 to 2,000 extension market and is said to allow station users to access a range of features without using hook-switch flash. Mercury is also said to transmit voice and data simultaneously, thus eliminating separate data switches, duplicated wiring, dedicated data phones, modems and acoustic couplers.

For data transmission, the switch is said to be compatible with current protocols and can reportedly connect compatible equipment as an integral part of the data network.

Priced at $300 to $400 per line, the switch will be available in May 1984. Additional information can be obtained from Tie/Communications at 5 Research Drive, Shelton, Conn. 06484.

Performance Monitor System Out

CHERRY HILL, N.J. — Avant-Garde Computing, Inc. has announced an enhanced Net/Measure performance monitoring system for smaller networks.

Net/Measure is a stand-alone, central-site system said to be capable of monitoring up to 12 lines and 700 terminals. The system is said to enable operators and managers to see how every terminal on every line is performing at any given moment. Real-time and historical performance data is displayed on a full-screen CRT and can be generated as printed reports, according to a vendor spokesman.

Net/Measure is compatible with IBM's Binary Synchronous Communications and Synchronous Data Link Control. Priced at less than $18,000, Net/Measure is available from Avant-Garde at 2091 Springdale Road, Cherry Hill, N.J. 08003.

Teletex Begins U.S. Service To Germany

WALNUT CREEK, Calif. — Teletex, an international commercial message communications service, recently inaugurated its operations in the U.S. with a message sent to West Germany from the Siemens Medical Laboratories here.

Developed by Siemens AG in West Germany and initiated through Western Union, Inc., Teletex service uses terminals which combine text typing and processing with automatic memory communications. The service operates at a transmission speed of 2,400 bit/sec, according to the vendor.

Teletex service is provided by Western Union and is available between 25 U.S. cities and between those cities and West Germany. The cost of the service is 85 cents/single page domestically and $1.34/single page between the U.S. and West Germany, with each additional page costing 35 cents and 84 cents, respectively.

Further information about the Teletex service is available from Siemens Communications Systems, Inc. at 186 Wood Ave., Iselin, N.J. 08830.

IBM Offers ATM Said to Dispense Exact Change

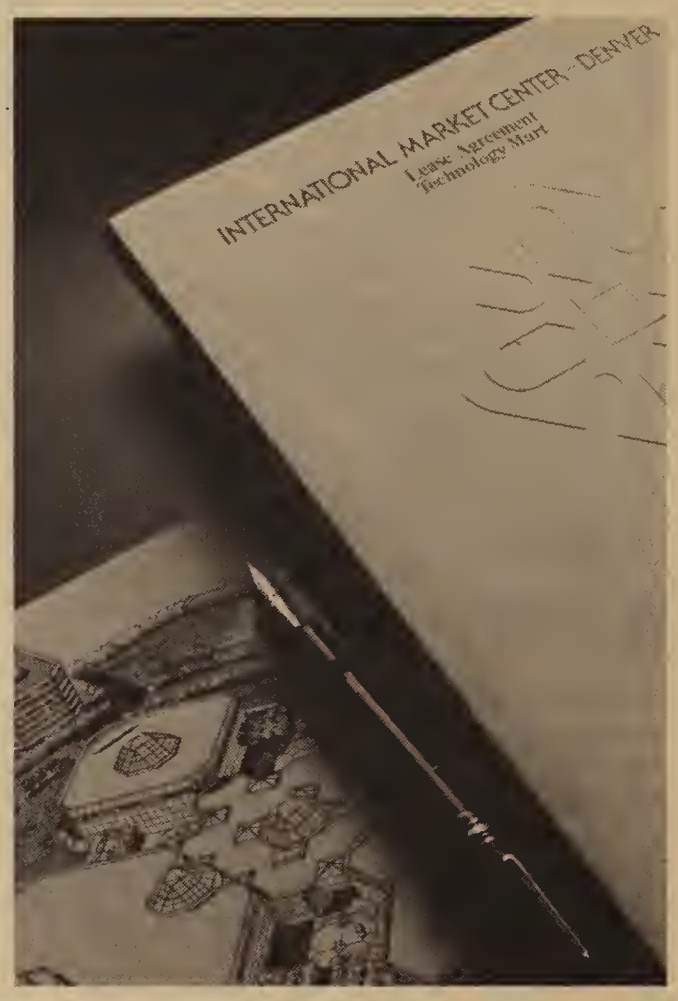
(Continued from Page 35)

nonglare 9-in. diagonal display. An optional privacy filter limits the view to the person standing directly in front of the screen.

The 4730 can communicate directly with IBM 370, 30 series and 4300 processors using existing Vtam, Tcam and NCP programs. In addition, application programs running under CICS/VS or IMS/VS can be used. The terminal also can communicate with a host processor through the 4701 finance controller, the spokesman said.

Purchase price is $20,000 for the basic single-console model and $32,700 for the basic two-console model. The coin dispenser costs $2,830; the check deposit, $3,640; and the envelope deposit, $1,720. The customizing program has a one-time charge of $6,000 or a monthly charge of $500. The monitor program has a one-time charge of $20,000 or a monthly charge of $1,600.

The ATM will be available in the fourth quarter of 1984. More information is available from IBM, Information Systems Group, 900 King St., Rye Brook, N.Y. 10573.



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Page Entry Terminal Works Without Operator Support

SCHAUMBURG, Ill. — Motorola, Inc.'s Communications Sector has introduced a new compact, desktop, page entry terminal.

Designed specifically for entry of alphanumeric and other pages, the Motorola Page Entry Terminal eliminates the need for operator assistance, according to the vendor. The LCD of the Page Entry Terminal displays 40 characters at one time. Messages longer than 40 characters are marqueed across the display.

The terminal's other features include: built-in speaker and telephone handset, computer and electronic mail access, built-in modem and autodialer, built-in clock, ability to operate during power loss, plus optional accessories.

The Page Entry Terminal is priced at $1,105 from Motorola's Communication Sector at 1301 E. Algonquin Road, Schaumburg, Ill. 60196.

Hand-Held Unit Monitors, Tests Interconnects

CIRCLEVILLE, N.Y. — RVS Electronics, Inc. has introduced a hand-held tester designed to monitor and troubleshoot modem and data terminal interconnects.

The Model PK-10 Modem-Terminal Interface Tester is an RS-232 interface diagnostic instrument. It incorporates 24 dip switches and associated breakout pins and 10-bar graph LED display, with the option of power from a battery or from the RS-232 interface.

Other features include one ground socket for control signal simulation, one B-positive socket for control signal simulation, one permanently fixed male and female two-pin connector, four single patch cords and two double patch cords, according to a vendor spokesman.

The product is priced at $69, the spokesman said, with delivery requiring two to four weeks. More information is available from RVS Electronics through P.O. Box 87, Circleville, N.Y. 10919.

Firm Cuts Price, Enhances Line Of Transceiver

BROOKFIELD, Conn. — American Photonics, Inc. has announced a price reduction for its TR1000 Fiber Optic Transceiver, along with two new versions of the product.

The TR1000A, with a maximum transmission distance of four to five kilometers, costs $200. The TR1000B, with a transmission distance of two to three kilometers, costs $150, and the TR1000C, with a transmission distance of two to three kilometers, costs $75. The price reduction is effective immediately.

Additional information is available from American Photonics at 71 Commerce Road, Brookfield, Conn. 06804.

Add-In ROM Boosts Terminal's Speed

NORCROSS, Ga. — Intecolor Corp. has introduced an add-in programmable read-only memory that is said to double the speed of its E8001G color graphics terminal.

Called Fastware, the average rate at which E8001G processes information is increased from about 9,400 bit/sec to 19,200 bit/sec. The processing speed of graphics plot codes is increased by about 35%.

Fastware is priced at $300 from Intecolor at Intecolor Drive, 225 Technology Park, Norcross, Ga. 30092.

Innovator Line of Printers Gets Extended Capabilities

MIAMI — Innovative Electronics, Inc. has announced extended communications interface capability for the Innovator 300 line/min printer system.

According to the vendor, the Innovator 202-FC provides complete IBM 2780 and 3780 emulation facilities within its built-in printer and Ascii terminal port.

Features include space compression or expansion, processor interrupt reception, conversational mode, component selection and vertical format control, according to the vendor.

The printer uses heavy-duty chain technology to print fully formed characters at a nominally rated print speed of 300 line/min. Speeds over 400 line/min are achieved using the 48-char. set. Clear, fully formed uppercase and lowercase characters are generated on up to six copies, the vendor said.

Models offering 132-col. and 80-col. forms are available.

The 132-col. printer is priced at $5,495, with delivery from stock within 30 days. More information is available from Innovative Electronics at 4714 N.W. 165th St., Miami, Fla. 33014.

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Integration Seen Fueling Modem Mart Growth

(Continued from Page 35)
been achieved in a few cases for signal processors (modulation and demodulation). The modem, in the commonly accepted definition of the term, should not be viewed as just a device for conversion of analog and digital signals — which in fact may not even be performed — but rather as a device whose hierarchically layered functions will be successively integrated into a single circuit.

Single-Chip Modem

Dave Fisher of Arthur D. Little, Inc. claims that it is already possible to build a two-chip modem and expects a single-chip 9,600 bit/sec modem to enter the market in 1984.

On the low end of the market, integration will eliminate the separate-box modem. The possibility of building an advanced modem with just a couple of chips will bring new opportunities right away for microcomputer manufacturers such as Tandy Corp. or Apple Computer, Inc., which may choose to integrate these advanced modems into their systems rather than sell a separate modem "box."

In France the government-run Postal, Telephone and Telegraph Adminstration is not particularly interested in a significant increase in telecommunications traffic and even less interested in supplying cheaper communications equipment to small users.

This phenomenon is also visible in the case of French videotex, for which the companies named above will supply hundreds of thousands of modems. But videotex, with the possibility of interconnecting different computers and terminals via telephone network, can spur the demand for modems even higher if modem prices start to decrease below $150, as they have in the U.S.

One might consider the case of a nationwide American network, operating since last summer, serving users of videotex and Atari, Inc. game terminals. The network uses three Stratus Computer, Inc. computers, serves 300,000 users and may be expanded to serve up to 12 million users of Atari 2600 and compatible game systems.

The operating company, Control Video Corp. (CVC), expects to provide message switching and home banking, using the telephone network at 900 and 1,800 bit/sec. The main factor behind this successful operation — which in fact resembles in some ways some public-service telecommunications projects now under way in France — is the low cost of the project's "home" modems, which have 8K bytes of random-access memory for downloading programs and are priced at $60 from CVC.

However, no matter what dominates the market — videotex, video games, microcomputers or combined applications of microcomputers and telecommunications — the increased demand for modems is inevitable and should be accompanied by miniaturization, abandonment of the "separate box" concept and a decrease in prices.

This article originally appeared in Le Monde Informatique, Computerworld's *French affiliate, and appears here as part of the CW International News Network. Jean-Pierre Cahier is a senior writer at* Le Monde Informatique.

SNA/SDLC Option Out for Direct 1600

SANTA CLARA, Calif. — Direct, Inc., a designer and manufacturer of integrated personal business computers, has announced an extended Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) communications option said to allow its Series 1600 computers to communicate with IBM mainframes.

The SNA protocol allows the Series 1600 to communicate with IBM systems and other SNA networks that support applications on Hewlett-Packard Co., Digital Equipment Corp. and IBM computers.

The multilayered SNA protocol runs on Direct's 1625 and 1631 computers and is designed to emulate the IBM 3274 Model 51C communications controllers with a 3278 display.

The 1600 system supports the same screen formats as those supported by the IBM 3278 Model 2 display station. The Direct SNA supports Ebcdic line transmission and status line messages. The 1631 also provides 24 function keys for 3278 emulation.

Both products are priced at $990, with delivery in 90 days. More information is available from Direct at 4201 Burton Drive, Santa Clara, Calif. 95054.

Turbomux-2 Offers Compaction

PALO ALTO, Calif. — Chung Telecommunications has introduced a data compaction unit with a two-channel statistical multiplexer.

According to the vendor, the Turbomux-2 will support either two 1,200 bit/sec data streams or two 2,400 data streams over a single Bell 212A or compatible modem.

The Turbomux-2 offers error detection and retransmission features which, according to the vendor, ensure high-fidelity data transmission.

The Turbomux-2 is priced at $995. More information is available from Chung Telecommunications at 4046 Ben Lomond Drive, Palo Alto, Calif. 94306.

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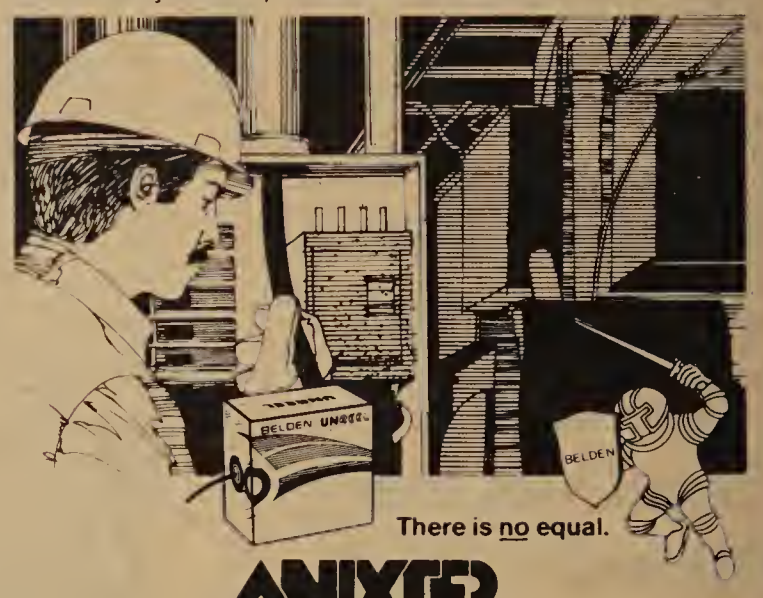

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Intertec Desktop Debuts, Compatible With IBM Micro

COLUMBIA, S.C. — Intertec has introduced Headstart, a desktop business microcomputer that features up to 1M byte of main memory, dual processors and both 8- and 16-bit program compatibility. The unit is compatible with IBM's Personal Computer.

Headstart is 15 in. wide, 11 in. high and less than a foot deep and weighs approximately 25 lb. The system has two housings: the CRT terminal enclosure, which houses the disk drive and processor/memory electronics, and a detachable keyboard. The system also includes a 3½-in. microfloppy disk drive and a random-access memory (RAM) disk, a disk emulation circuit, the vendor said.

The 1M-byte memory model is the VPU 1000. The VPU 512 comes with 500K bytes of memory, while the VPU 128 has 128K bytes. Both the VPU 1000 and the VPU 512 include a 3½-in. microfloppy disk drive, the vendor said.

Headstart reportedly permits a second disk drive to be emulated via the company's RAM disk feature. Up to 1M byte of user memory can be partitioned as emulated disk memory.

The two standard microprocessors are the Intel Corp. 8086, a 16-bit processor, and the Zilog, Inc. Z80A, an 8-bit processor. Two operating systems are offered as standard features: Microsoft, Inc.'s MS-DOS for 16-bit software and Digital Research, Inc.'s CP/M 80 for 8-bit packages, the vendor said.

According to a spokesman, Headstart is both a single and a multiuser microcomputer. Although it may be purchased as a single-user, stand-alone workstation, it can be expanded for use in a local-area network.

Up to 255 Headstart video processing units (VPU) can be linked together via the company's proprietary, high-speed coaxial interface. Users can start with a single VPU and later add users with the addition of a coaxial connection, the vendor said.

(Continued on Page 40)

Business Micro Said to Incorporate Development Tool For Non-DPers

SUNNYVALE, Calif. — Logical Business Machines, Inc. has introduced a business microcomputer that incorporates an application development tool that can reportedly be used by both programmers and nonprogrammers.

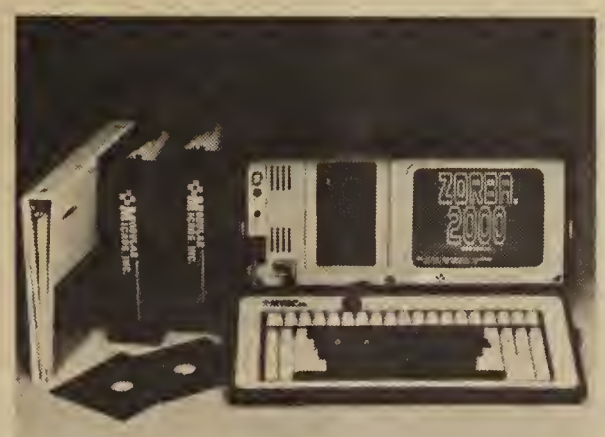
The Logical L-XT is a 16-bit system that includes the firm's Logical Natural Language. The system can be used for developing custom applications. In addition, the unit can be equipped with Microsoft, Inc.'s MS-DOS operating system. This gives the unit compatibility with IBM's Personal Computer software, the vendor said.

The computer also offers 192K bytes of random-access memory (RAM), a 10M-byte Winchester hard disk (upgradable to 60M bytes), a 320K-byte floppy disk and an amber CRT screen. Two IBM expansion slots are available to the user, and the system includes one parallel and two serial ports for attaching printers, modems and other peripherals, the vendor said.

According to the vendor, the Logical Natural Language allows users to produce data entry screens and reports as well as create and manipulate data files.

The language consists of "verbs," which are used to create and index files,

(Continued on Page 42)



Modular Micros, Inc.'s Zorba

Zorba Micro Line Gets Co-Processor, Hard Disk Version

FORT LAUDERDALE, Fla. — Modular Micros, Inc. has introduced a hard disk version of its Zorba series of portable computers. The firm also announced a co-processor for the series.

The Zorba Model 2000HD incorporates a 5¼-in., 10M-byte Winchester disk drive packaged with one 800K-byte flexible diskette drive. The unit features a a Zilog, Inc. Z80A microprocessor, 64K bytes of user memory, Digital Research, Inc.'s CP/M 2.2 operating system and a 9-in. green or amber video display. It is a self-contained unit weighing 25 lb, the vendor said.

(Continued on Page 42)

Power Stabilizer Saves Agency $174,000 in Hardware Costs

HARRISBURG, Pa. — A state agency here claims a 60Hz motor generator power stabilizer, which cost $64,000, saved $174,000 in the past year in hardware replacement costs and an estimated $500,000 in employee overtime.

According to Fred A. Weisman III, director of the Bureau of Technical Services at the Pennsylvania Department of Public Welfare, the department's Sperry Corp. 1100/84 mainframe uses 1,300 terminals connected to a telecommunications network in order to process more than 500,000 daily transactions throughout 64 counties.

The department's central computing facility had been using a 60Hz to 415Hz frequency converter from KW Control Systems, Inc. for some time. The frequency converter automatically conditioned power to the central processor, according to Weisman.

However, up until November 1982, the department did not use a power conditioner for its 60Hz peripherals, he added.

'Getting Out of Hand'

"Sometime in August 1982," Weisman said, "we became aware that the frequency of disk drive printed-circuit board failures and failures of head disk assemblies was getting out of hand. The system was being interrupted, and downtime was excessive. This was an intolerable situation."

Weisman formed a task force to study what could be done about peripheral downtime. The task force included the department's DP operations director, James Gray, and several representatives of Sperry's engineering group. The task force decided to evaluate how many times there was a system interruption and conduct a search to determine what was causing the problem.

The Sperry engineers brought in a power monitor in order to evaluate the power coming in from the utility company. Power was monitored for an eight-month period that extended from January 1982 to August 1982.

In that time, there were 20 printed-circuit board failures in Sperry 5056 and 5046 control units and 42 disk drive printed-circuit board failures in Sperry 8470 and 8450 drives. That was an average of eight print-

(Continued on Page 42)

Even though it is less than a week before Christmas, Symbolics, Inc. has unwrapped its Spartacus Computers, Inc. IBM-compatible mainframe a little early. Page 44.

Micad Touts Mix of CAD/CAE, Development

REDWOOD CITY, Calif. — Kontron Electronics has introduced a computer-aided design and engineering (CAD/CAE) workstation which can be integrated with a microcomputer development system.

Called Micad, the workstation is a hardware and software development system that allows engineers to design printed circuit boards and gate arrays, the vendor said.

Schematic input and hand-drawn layouts for printed-circuit boards and gate arrays are created using a digitizer. A graphics editor allows device interconnection, and a symbol library is also included, the vendor said.

According to the vendor, Micad bridges the gap between development and CAD/CAE systems by offering both capabilities in an integrated stand-alone system.

A Micad system consists of a Kontron KDS-980 development system which runs under Digital Research, Inc.'s CP/M operating system. Storage is provided by dual 5¼-in. floppy disks and a 10M-byte hard disk, the vendor said.

Two monitors come with the system: a 17-in. graphics monitor that has a resolution of 1,024 by 768 points and a 15-in. data monitor that displays 25 lines of 80 char./screen. Both monitors have adjustments for height and viewing angle.

Micad software allows direct digitizing and interactive cell layout of printed-circuit boards from two-sided to multilayer designs. Interface software enables the system to communicate to a more powerful CPU such as a Digital Equipment Corp. VAX-11/780 superminicomputer for memory and computer-intensive functions like simulation, plotting or design rule checking, the vendor said.

The 280 by 280 digitizer tablet has .025mm of resolution. Its cross-hair cursor offers parallax-free viewing, and its 16 control buttons allow one-handed operation. A graphics printer that allows high-resolution hard copies of the graphics screen and a pen plotter that produces large format check plots are optional.

The complete Micad system sells for $25,000. The KDS-980 Kontron workstation can be upgraded to Micad for $10,500 from Kontron Electronics, 639 Price Ave., Redwood City, Calif. 94063.

Processor Board Fits Nova Mini

DOBBS FERRY, N.Y. — Ardent Computer Products has announced the Supermap Processor Board, a 15-by 15-in. multifunctional printed-circuit board for users of Data General Corp.'s Nova minicomputers.

The product is compatible with the control and data switches of the Nova and can reside in either the CPU or I/O slots of the Nova chassis, the vendor said.

The processor consists of a 16-bit processor with 128K bytes of main memory. Memory is reportedly expandable to 256K bytes for use with the Nova instruction set.

The unit costs $3,500 from Ardent Computer Products, 145 Palisades St., Dobbs Ferry, N.Y. 10522.

Desktop Micro Introduced By Intertec

(Continued from Page 39)

Headstart also features a variety of user-oriented utilities including electronic mail, software file protection, individual user password generation, individual VPU logon/off and programmable user security features, the vendor said.

Two optional tabletop Data Storage Systems will be available for users who desire local-area network operation or enhanced data storage capability. Both feature the vendor's data networking system, which permits multiple VPUs to share common and/or restricted disk data bases.

The DSS-10 utilizes a 5¼-in. Winchester disk drive that is upgradable to 20M bytes. Another model, the DSS-50, uses an 8-in. Winchester disk featuring 25M bytes of fixed storage and 25M bytes of removable data to ensure data base integrity. The DSS-50 can be expanded by adding up to three auxiliary 50M bytes for a total capacity of 200M bytes, the vendor said.

According to a spokesman, interfaces for Headstart include a coaxial communications interface, an external disk I/O interface, an expansion bus interface, an RS-449/RS-232 serial communications port and a Centronics Data Computer Corp.-compatible parallel printer port.

Headstart can be connected to a variety of different modems and printers, the vendor said, including a high-speed line printer and future expansions.

Headstart comes with a 12-in. nonglare screen with a green phosphor character display and costs from $1,795 for a VPU. A disk-based model with 500K bytes of memory is selling for less than $3,500, the vendor said.

More information is available from the vendor at 2300 Broad River Road, Columbia, S.C. 29210.

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Agency Cuts Downtime With Power Stabilizer

(Continued from Page 39)
ed-circuit board failures a month. In addition, there was an average of 2½ head disk assembly failures a month, Weisman recalled.

"The average monthly cost for printed-circuit card and [head disk assembly] hardware replacement alone was $14,500," Weisman explained.

"But far more serious was the havoc such fallout could cause in the field due to incorrect computation and other errors, lost processing time and overtime required every time our system would fail causing downtime," Weisman said.

Overtime alone was getting to be a major expenditure, according to Weisman.

"We actually documented the department's cost of overtime required by system downtime attributed directly to failures of 60Hz peripherals in September and October 1982 at $200,000. That was just for that two-month period," Weisman explained.

Cause of Downtime

The task force discovered the cause of the downtime to be periodic power surges and sags coming into the 60Hz power system from the utility.

At one point, power spikes were recorded at more than 100V on each input phase, Weisman recalled.

"At this point, the Sperry engineering group concurred that we go with a 300-kVac [KW Control Systems] Piller 60Hz motor generator power stabilizer," Weisman said.

The solution appears to have worked. In the year since the power stabilizer was installed, the department has had only two printed-circuit board failures and one head disk assembly failure, Weisman said.

"Based upon the average failure rates we were experiencing before we installed the power stabilizer, we could have expected a total of 96 failed printed-circuit boards and 31.2 [head disk assembly] failures during that same period without the power stabilizer, and of course, a commensurate amount of system downtime," Weisman added.

The power stabilizer paid for itself within six months, and Weisman estimated it has saved about $500,000 in overtime. "It is conceivable that we have realized substantial additional savings due to a reduction in processing errors," Weisman maintained.

'Imperative in Any System'

"My own conclusion," Weisman said, "is that conditioned power is imperative in any DP system and not just for the mainframe, but for all 60Hz peripherals as well.

"This is particularly true for any on-line system, such as ours, which operates through a large telecommunications terminal network. DP managers and facilities simply cannot take it for granted that the utility power coming into their system is going to be computer-grade power," Weisman said.

He suggested other DP managers conduct surveys similar to that conducted by the Department of Public Welfare.

Zorba Line Gets Hard Disk, Co-Processor

(Continued from Page 39)
The system offers bundled software from a variety of third-party suppliers, and the unit emulates more than 30 different disk formats including Xerox Corp.'s 820 and Digital Equipment Corp.'s VT-180, according to the vendor.

The 2000HD offers a full Ascii keyboard with 19 special function keys capable of up to 55 programmable functions, including a terminal communications capability with a host computer and a built-in power supply selector, suited for either 110V or 220V operations.

The initial product offering with 7-in. high-resolution CRT terminal, Z80A microprocessor, 64K bytes of user memory and two 400K-byte disk drives is priced at $1,595. The Zorba 2000, featuring a 9-in. amber or green screen, Z80A microprocessor, 64K bytes of user memory and either two 400K-byte disk drives or two 800K-byte disk drives costs $1,995 and $2,295, respectively.

In addition, the firm announced a co-processor for its Zorba 2000 series of portable computers.

The co-processor is a field-upgradable enhancement that features a 16-bit Intel Corp. 8088 microprocessor and 256K bytes of random-access memory. Digital Research, Inc.'s CP/M 86 and Microsoft, Inc.'s MS-DOS operating systems are supported by the Zorba co-processor, the vendor said.

According to a spokesman, the co-processor was designed for users who run large, complex programs. The extra memory and processing enhancements reportedly offer the user greater program sophistication with the convenience of portability.

The Zorba 2000 co-processor is a printed-circuit board that mounts inside the Zorba processor. For users who want to run Digital Research's CP/M 2.2 operating system, the co-processor can be used as a 256K-byte random-access memory drive, the vendor said.

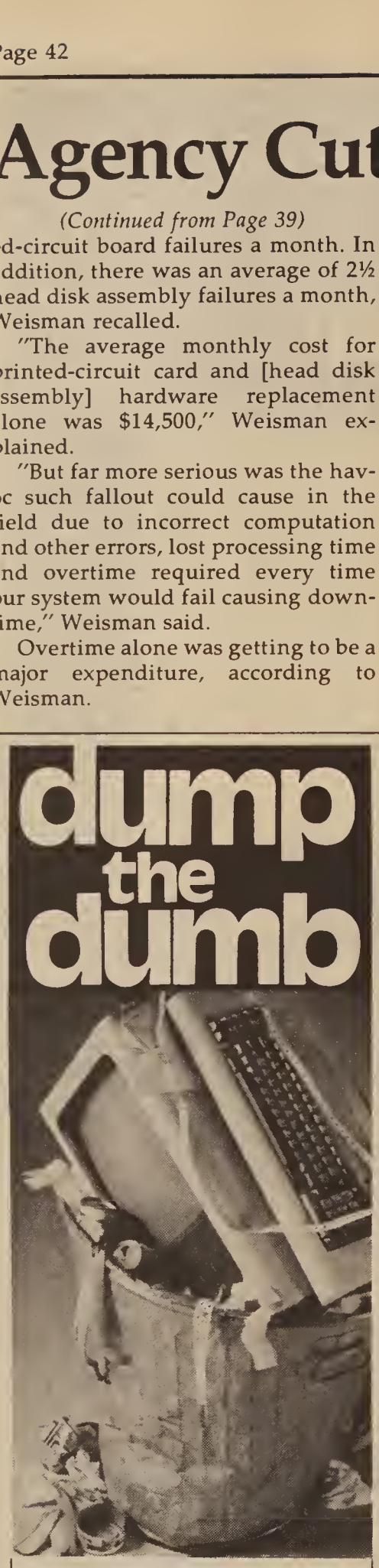
The co-processor is scheduled for delivery starting in January 1984. The retail price is $795. More information is available from Modular Micros through P.O. Box 6099, Fort Lauderdale, Fla. 33310.

Business Micro Incorporates Application Tool

(Continued from Page 39)
manipulate data, enter prompts on the screen and accept entry data from the user; the "nouns" represent the user's data, the vendor said.

The L-XT system can be expanded with an additional 50M bytes of hard disk storage and 128K bytes of additional RAM. Other options include memory protection from power failure, streaming tape backup, clock and calendar and additional parallel and serial ports to accommodate printers, modems and other devices.

A typical system costs $5,985, which includes a monitor, word processing package, spreadsheet, real-time clock and power backup. More information is available from Logical Business Machines, 1294 Hammerwood Ave., Sunnyvale, Calif. 94086.



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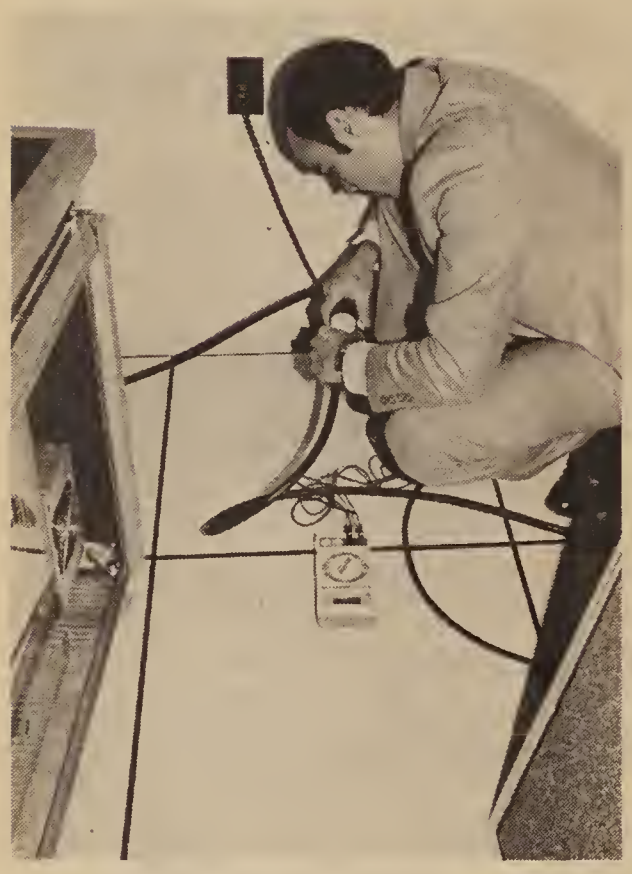
First-User Installation Sees Spartacus K102 Running in Half Hour

CAMBRIDGE, Mass. — Installation technicians from Spartacus Computers, Inc. had good luck with the firm's first-user installation of its IBM-compatible mainframe. The technicians managed to have the system up and running in about 30 minutes.

Purchased by Symbolics, Inc., a computer research and development company, the Spartacus K102 processor is one component of the Spartacus System, a workstation-based system designed to offer distributed processing and IBM 370 compatibility to office users.

The Symbolics configuration includes the K102 distributed processor with 1M byte of main memory, 150M bytes of hard disk storage, a Xerox Corp. Ethernet local-area network control unit and Spartacus' Knet software package. Knet reportedly allows IBM and compatible processors to connect to the Ethernet local-area network and permits telephone connection to long-haul networks. Also included in the configuration are two IBM 3278-type terminals manufactured by Visual Technology, Inc., of Tewksbury, Mass., a Symbolics spokesman said.



"We looked at alternative systems but there were complexity and cost problems," according to James E. Kulp, manager of networks development for Symbolics. All the other solutions required two or three pieces of hardware, Kulp continued. The Spartacus product did it all in one step. This allowed Symbolics to use one piece of hardware and one standard interconnect (Ethernet) to tie directly to another standard interconnect (an IBM channel), Kulp explained.

Additional components of the Spartacus system include the Spartacus KOS virtual-machine operating system, video display terminals and the Knet networking subsystem, according to Spartacus.

Symbolics purchased the Spartacus system with the hope of extending the market for its Lisp-based computer system, the Symbolics Computer System, to users of IBM mainframes.

'Dance With IBM'

"As our original market, which was mostly research and academia, expands, we're running into more commercial customers and running into more IBM systems," Kulp said. "And if we want to reach that market we have to dance with IBM as we dance with other computer manufacturers.

"We chose the Spartacus system because it had two important things," Kulp said. "One, [it] had a direct Ethernet channel attachable controller and second, [it has] a software package with which you can communicate over Ethernet using a standard set of protocols."

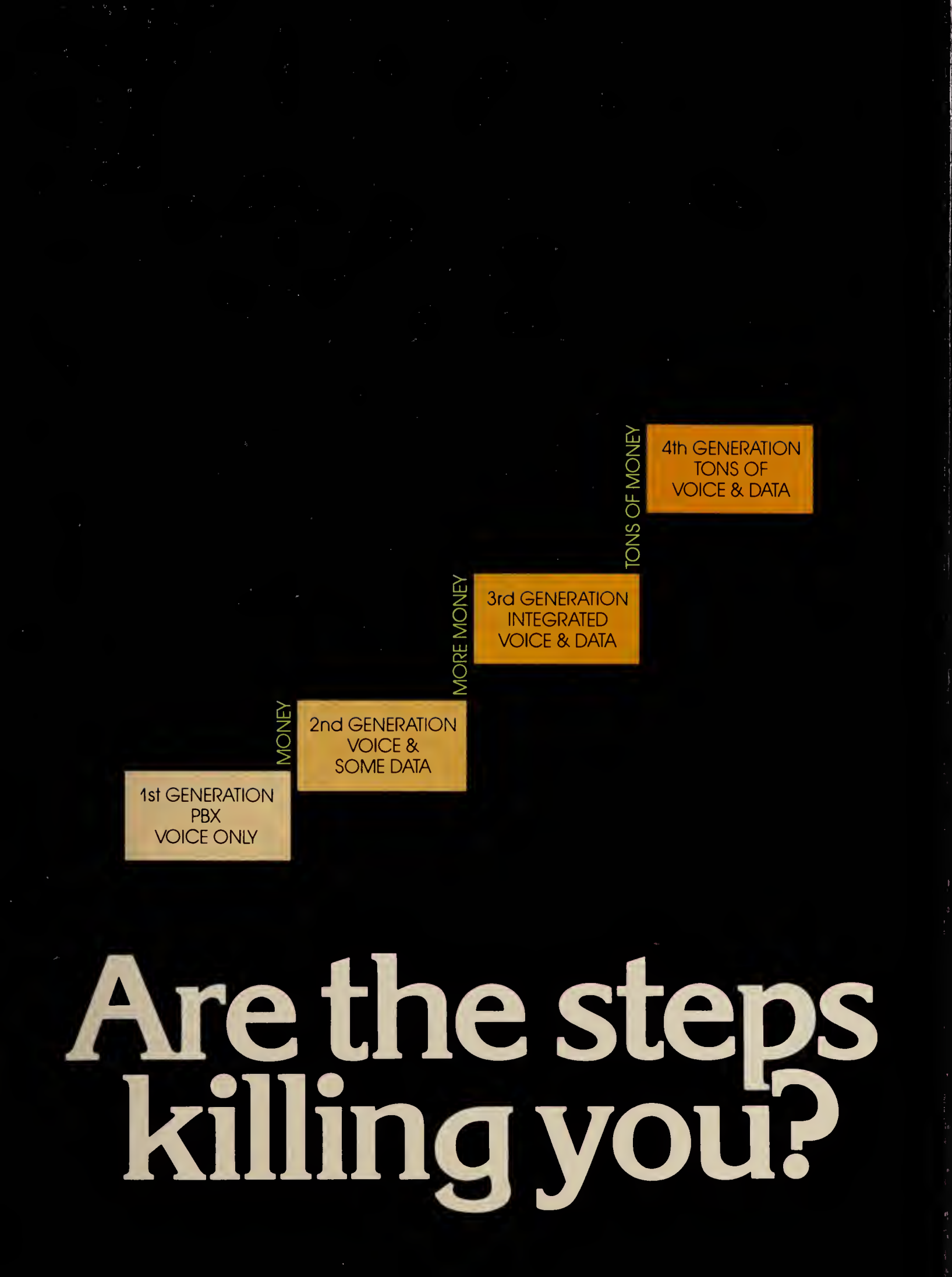
A Spartacus spokesman noted that the Knet network offers users one integrated local and long-haul network for IBM's 370-architecture processors. The Knet is a datagram-based network designed to interconnect Spartacus K102 processors, 370-compatible processors and servers. This permits the sharing of peripheral devices from a variety of vendors. The network consists of Knet software and an Ethernet control unit.

The network runs unmodified as a subsystem in a virtual machine under IBM's VM/370, VM/SP operating systems or under the Spartacus KOS operating system.

According to a spokesman, a typical Spartacus system costs between $65,000 and $122,000.

Photos and Text by Lynn Haber

James E. Kulp, Manager of Network Development for Symbolics, Inc., signs acceptance of delivery papers (top left); Benjamin Petterson, Senior Technical Support Specialist with Spartacus Computers, Inc., sets up one of the two 3278-type terminals (top right); Spartacus Systems Programmer David Foss plugs the K102 processor into 110 volt service (bottom left); and Spartacus Computers representatives waiting for the system to come up (from left to right, Benjamin Petterson, Patrick Lucci, James Burhnam, Michael D. Rivers and David Foss) (bottom right).



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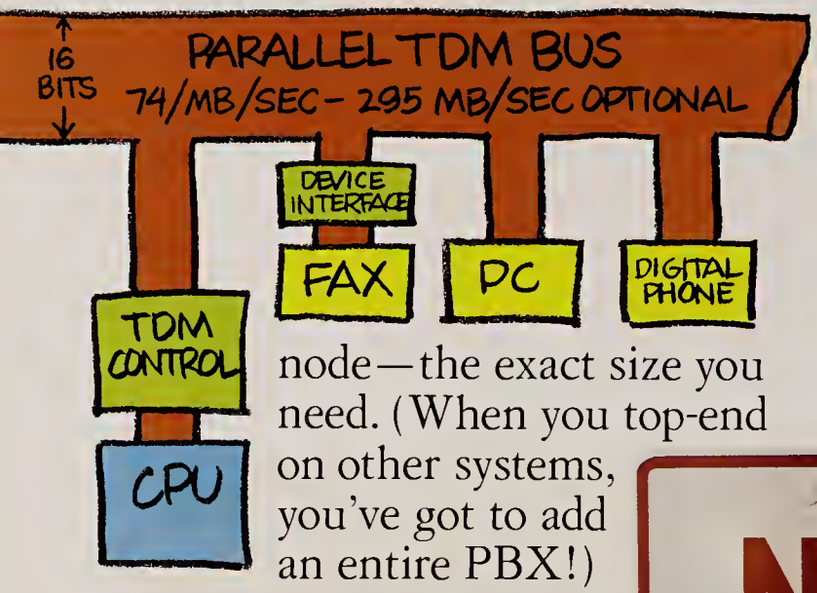

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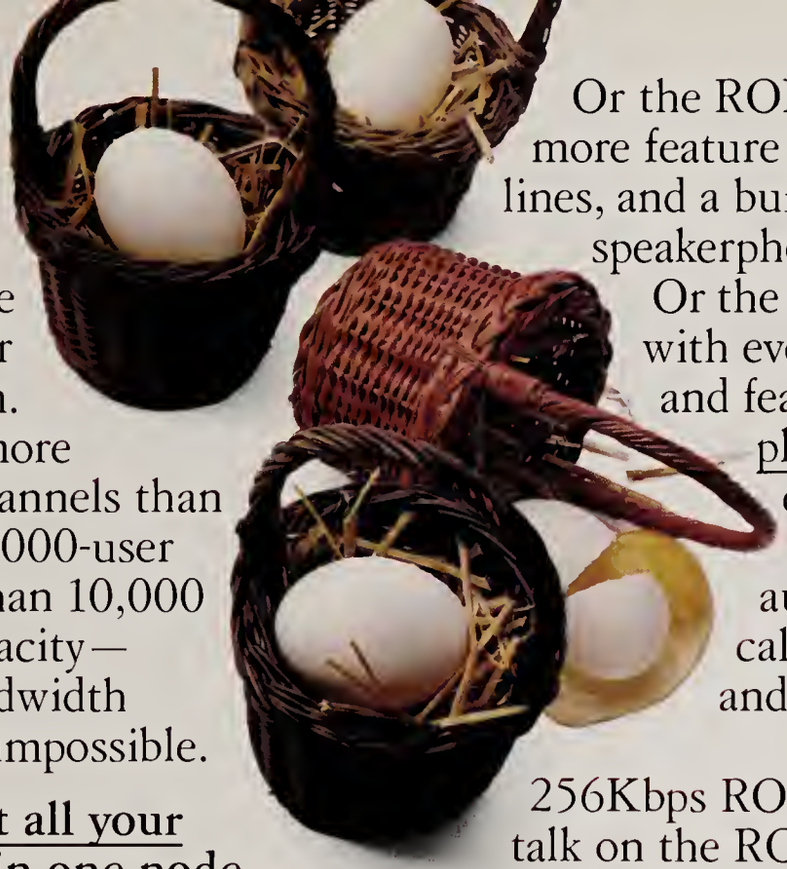

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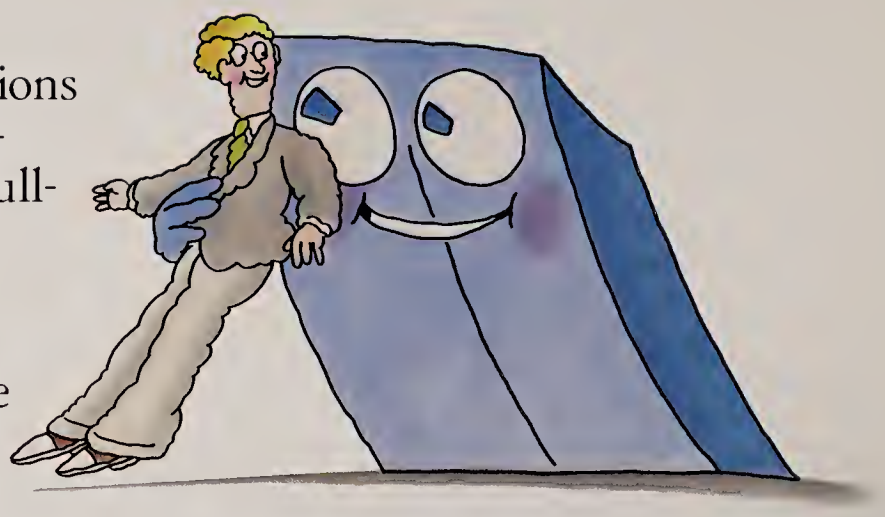

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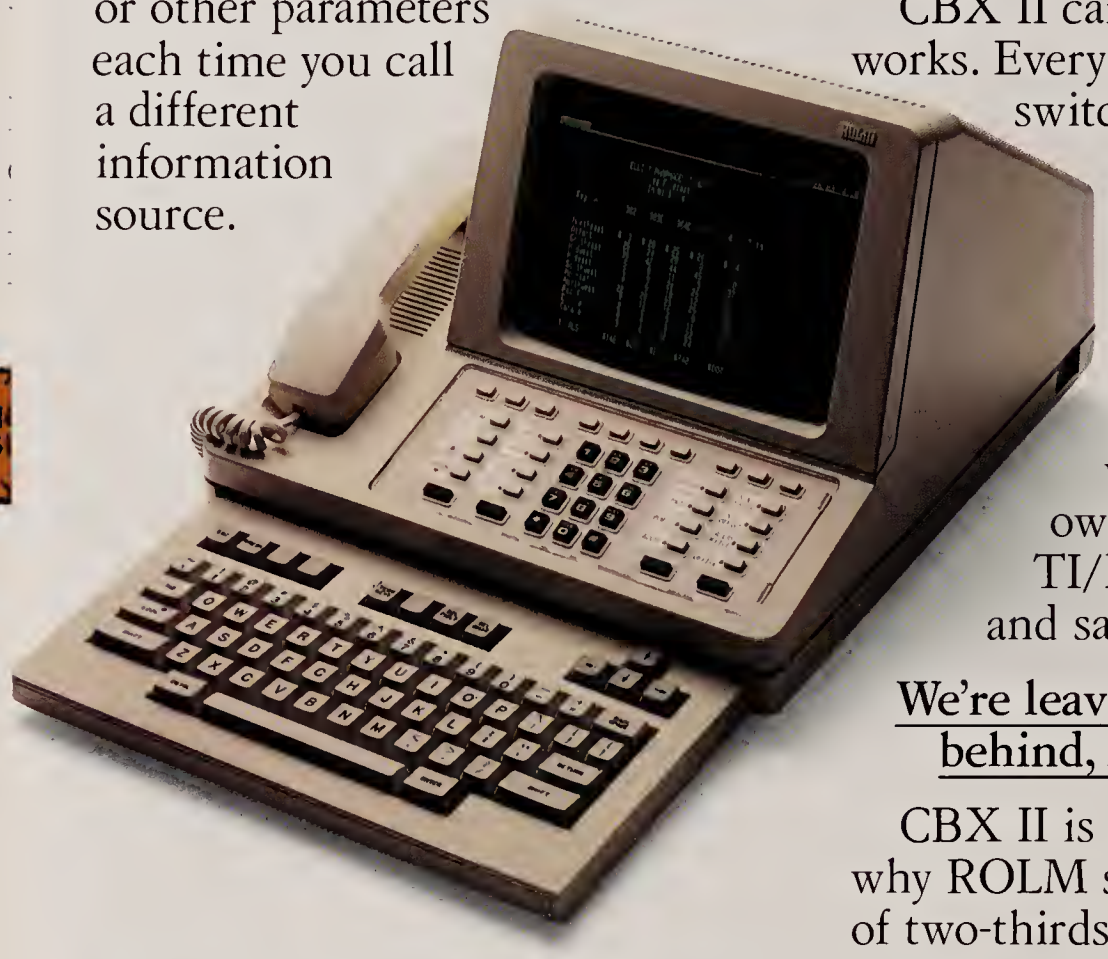

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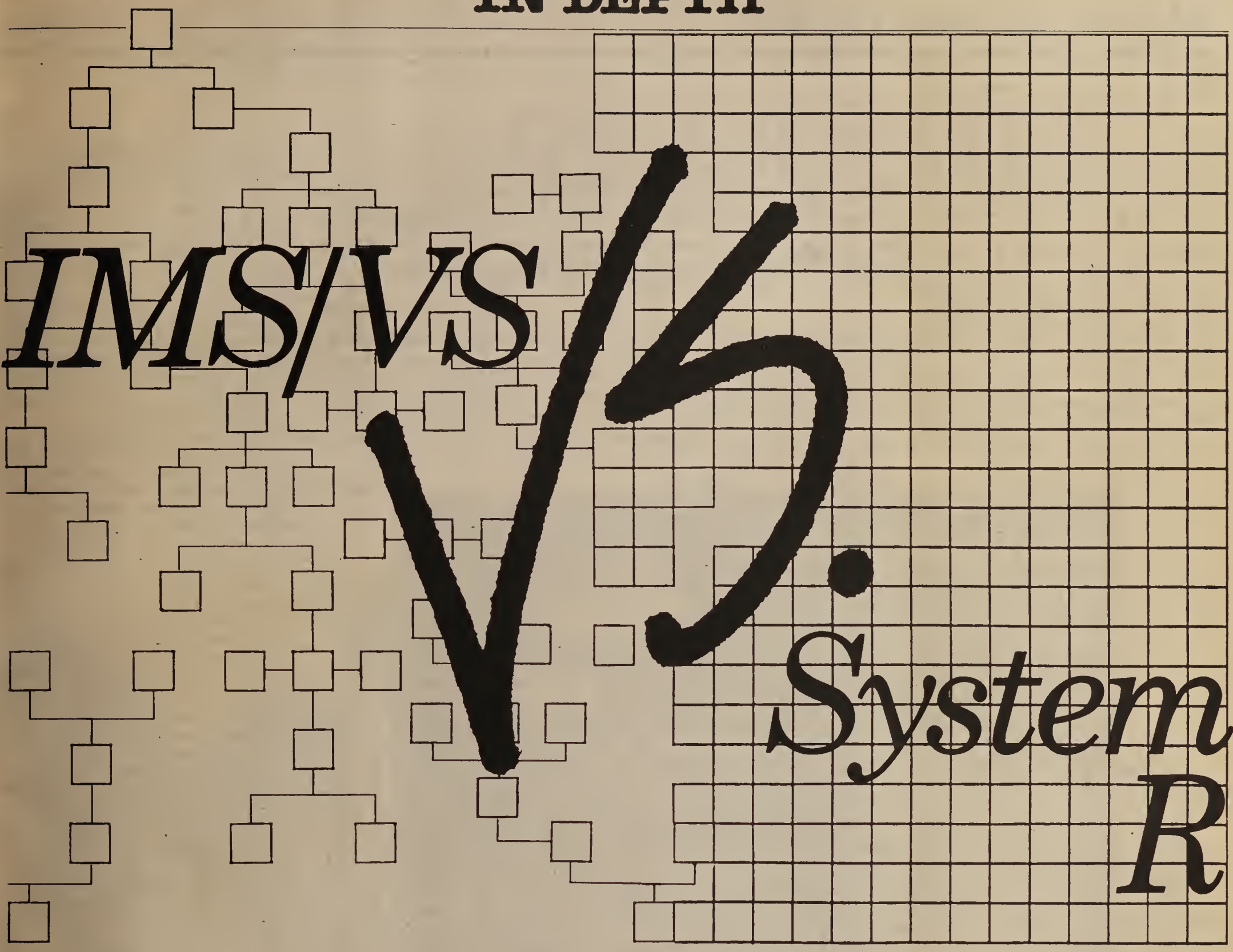


Comparing IBM's Hierarchical and Prototype DBMS

By Monica Ajmani Hickey

IBM continues to refine its prototype System R, a relational DBMS that promises more power and adaptability than the hierarchical IMS/VS.

Information Management System/Virtual Storage (IMS/VS) is the principal hierarchical data base management system (DBMS) provided by IBM for its 370, 30 series and 4300 systems. Advancing into the frontiers of relational theory, IBM is currently refining its prototype System R, heralding the first projected general-purpose relational DBMS. Following is a comparative analysis of IMS/VS and System R at this turning point in DBMS technology. The description of System R is based on published material in the *IBM Systems Journal* and other sources.

Physical Organization. In a hierarchical DBMS such as IMS/VS, a physical data base is an ordered data set. Within this data set are fixed all of the occurrences of one type of physical data base record. The physical data base record is built as a structure of data elements, identified as segments, which are systematically ordered in a series of hierarchical relationships.

A typical physical data base record will contain many segments. A segment is defined as a unit of access that contains one or more fields of data. A segment might contain such fields as employee name, organization number, job code and base pay.

The relationship built from a subordinated series of segments is known as a hierarchical structure and is analogous to the layering of a tree structure. It is commonly identified as the parent-child relationship. This method of structuring data follows an evolving process of subordination, requiring data base reorganization as the data elements are modified.

In elaborating on this IMS-unique parent-child relationship, it is important to emphasize the logical relationship between the segments as a hierarchy. The highest, or root,

IN DEPTH

segment is the definitive source of the remainder of the hierarchy. A conceptual relationship, from the root, links these subordinating segments, and the user can select other logical file organizations from them. These relationships are logical file organizations (unidirectional and bidirectional pointers) commonly identified as physical twin, logical twin, physical parent-child and logical parent-child.

The user will designate one or more sets of all segments in the physical record that will appear in the data base logical hierarchy. These are called "sensitive segments," and, as they are grouped into sets, they are then arranged into the specified logical hierarchical relationship.

It is apparent from the literature on System R that the user (data base designer) will not be required to possess in-depth knowledge of its physical structure. Most of it will be internal to the DBMS.

IMS/VS supports up to 255 fields per segment (record) and up to 1,000 fields per data base. Variable-length fields and segments are supported. The maximum length of a field is 255 characters and, for segments, there are 32,000 characters in most retrievals.

The physical organization of System R is governed by a subordinate data base manager known as the Research Storage System (RSS). In RSS, segments are the primary basis for data storage, and each segment is grouped into a collection of logical address spaces that are used to organize physical clustering. Although one segment can support several tables, all of a table's records must be confined to one segment.

The N-ary relation, the central data object in RSS, features a "time-varying" number of records. These N-ary relations are conveniently identified as tables. Tables are flexible to user changes without a data base reload. Another feature provided, as a means of addressing records, is an identification known as Tuple Identifier (TID). TID is used to identify all records in a table. The RSS Index is established to correspond a given table with specific values in related sort fields. The RSS Index thus performs an access for each view of a table. An index is compiled for each segment containing a table.

An important advantage of System R is the capacity to utilize the Research Storage Interface (RSI). RSI is an organizing navigational data manager built with System R to offer record-at-a-time operators on base tables. The RSI performs its function in a very dynamic environment. The RSI employs the RSS-created identifiers and data segments, tables, access paths and records. The RSI then uses its own working storage areas for its segments and access paths addressed as indexes and links.

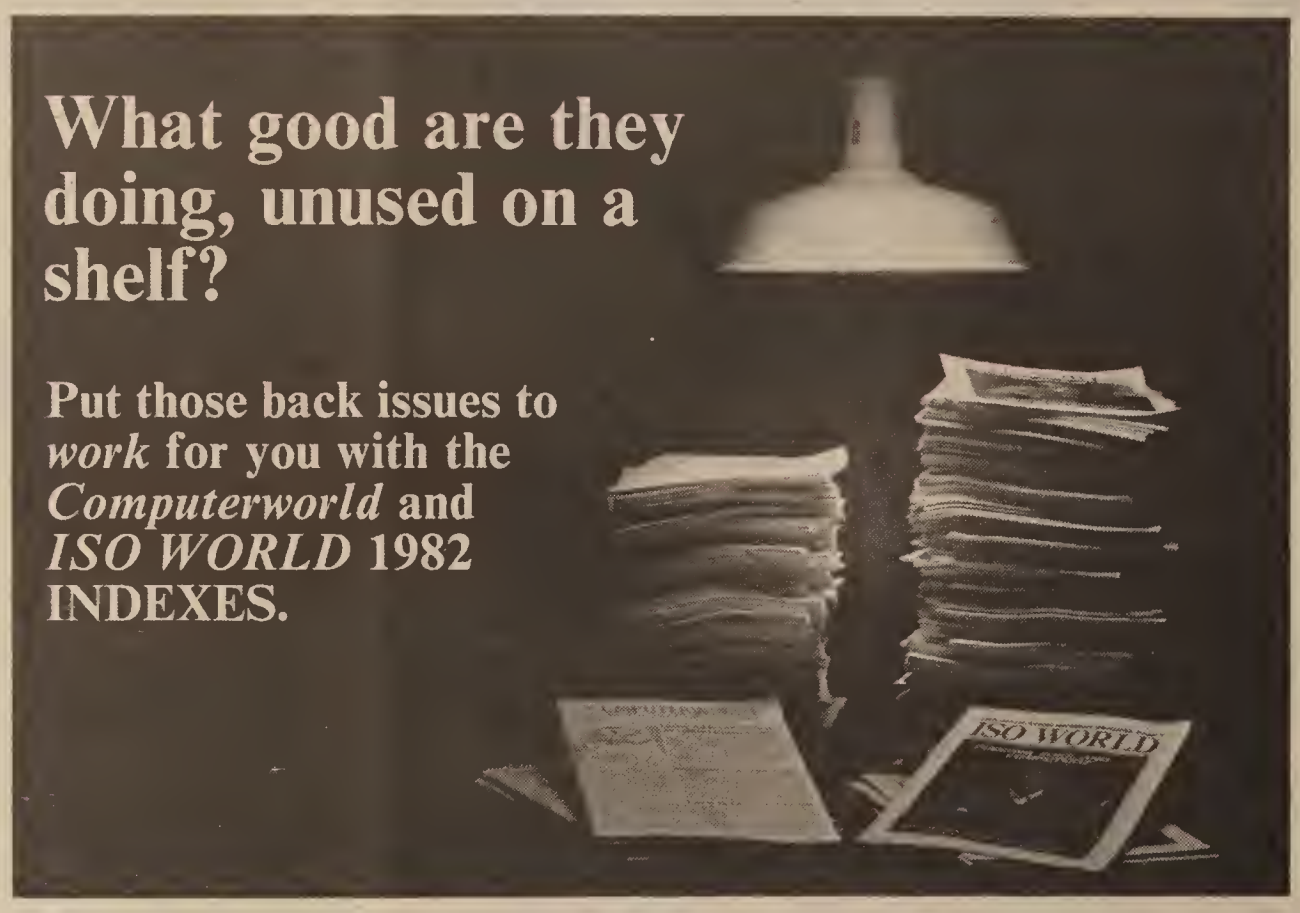
Finally, each segment of the RSS is stored in a sequence of pages on disk. Each page contains 4,069 bytes of disk space, which is allocated randomly. Each page then performs a transfer unit to virtual storage.

The fundamental difference between these two data structures, in physical organization, is that IMS/VS presents data in a hierarchy and System R presents data in a tabular, relational structure. Efficient utilization of space is sometimes easier when using the hierarchical structure. In System R, data must often be duplicated excessively.

Traditionally, data often forms a natural hierarchy. While working with the two structures, if required, the mapping of hierarchies to relations is not always simple to delineate. It is also apparent from the literature on System R that the user (data base designer) will not be required to possess in-depth knowledge of its physical structure. Most of it will be internal to the DBMS. Currently, the IMS/VS data base designer is sufficiently familiar with the physical structure to be able to develop efficient data bases.

Logical Organization

The logical organization of IMS/VS is integrally compatible with its physical organization. The logical



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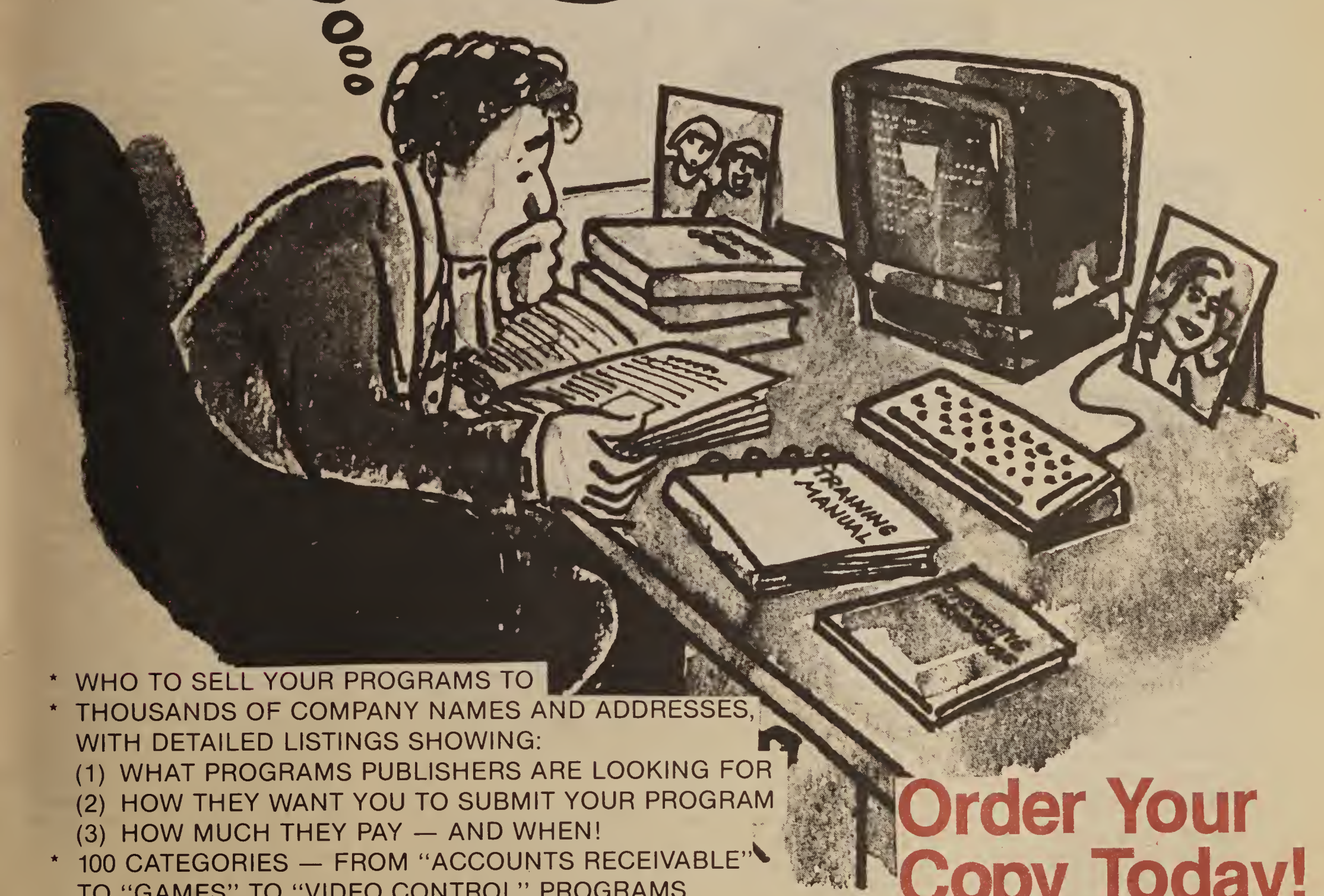

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data base is a series of records organized such that one record is one single-rooted tree of segments based on one tree-structure record type. In the design transformation from physical to logical record types, the physical record may be chosen as a pattern for construction. The segment type is identified, and its identifier may be changed to accommodate the logical structure. The segment type and its subordinating dependent segment structure types are omitted. Then a concatenation is assembled, building from logical parent to logical child. Antecedents and dependents of this logical parent can be linked as dependents of the complete concatenated segment.

The IMS/VS logical structure functions as a virtual data base and does not exist independently in storage. It is a two-dimensional system that requires logical data base segments to be drawn from the physical data base, as required, through the application program.

In System R, the logical organization is very powerful and adaptable. Physical structure is immediately transparent to the user. In fact, multilevel view-on-views are available to the user.

In addition, the underlying stored data may change in structure, leaving many user views unaffected. Since increased data independence is a major objective of enhanced data base design, the feature of multilevel view-on-views makes System R an especially attractive data structure. The System R internal data storage format is not an immediate user concern. User query response from the data base is shown in the form of a table, which may be stored as a view.

Further facilitating user control, System R enables users to specify only a limited view of a table, such as a row or column subset, so they are not required to browse through the entire table. This very flexible authorization mechanism also provides the option of locking specific columns as "read only."

A comparison of logical models reveals the substantial advantages of System R. System R's logical model affects how most users see data value: in a tabular view. This feature, obviously, will make the system very appealing to nonprogrammers. In addition, data base design is not the laborious and cumbersome process required for IMS/VS. System R's clean and simple tabular views can represent almost all expressions. The IMS model additionally requires an understanding of the use of pointers (virtual record types). In a very straightforward and logical hierarchical relationship, using the IMS model is a very systematic process. Organizing relationships and involving complex groupings of many-to-many links are facilitated by the relational model and, by comparison, very difficult to order by the IMS/VS model.

Access Paths

The comparison of each system's access path selection process further illuminates the contrast between IMS/VS and System R. The IMS/VS data structure makes use of physical pointers for the purpose of scanning records in hierarchic order and offers rapid access to segments within a record. The following access methods are provided: Hierarchic Sequential Access Method (Hsam); Hierarchic Indexed Sequential Access Method (Hisam); Hierarchic Indexed Direct Access Method (Hidam); and Hierarchic Direct Access Method (Hdam).

Each of these access methods possesses different storage and performance characteristics, and the user must, therefore, choose a method that closely fulfills the requirements of the data base being implemented. This selection is specified in the data base definition statements. Coding methods vary to support the access path required. Normally, one record at a time is accessed. Users' operations are based on predefined access paths in IMS/VS.

System R unburdens the user from defining access paths. The system has a built-in optimizer to determine access path selections. The optimizer functions by examining the properties contained in the query and the access paths defined for the table requested by the query. It then calculates a cost estimate for each access request by employing the following cost algorithm:

COST = PAGE FETCHES + W * (RS1 CALLS)

To minimize the cost for each path, System R's specification is set up to reduce the total resource requirements for processing a query. The computed cost by the optimizer

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is a weighted measure of I/O performed and CPU used. The RSI calls are the anticipated total records retrieved from the RSS that will be used for a query.

System R catalogs the estimated costs and statistics gathered from several sources. The optimizer uses these statistics to determine cost estimates for the execution of statements, requesting different access paths, such as sorting, indexes and scanning. The least expensive access path is used automatically.

In System R, all access requests are based on field values in the tables. All access operations are executed on tables, resulting in the output appearing in a new table.

Data Base Definition

In IMS/VS, the Data Base Definition (DBD) is used for the individual data base to specify both the logical and physical data base definition. The physical data base is mapped into storage according to the specification defined in the DBD as Hsam, Hdam, Hisam or Hidam. The DBD also contains the name and size of the segments. In addition, the DBD specifies the relationship among segments in the data base and the relationship among segments with other data bases. Logical data bases are defined in the DBD from physical data bases that exist. A logical data base may be defined as a subschema of a physical data base, or it may be a subschema defined as a relationship from many physical data bases.

System R provides a revolving and simple data base definition procedure. Using Structured Query Language (SQL) statements, users can dynamically change access privileges assigned to various users. Users can also create or delete tables, create or delete indexes on tables, add columns to the established tables, initiate a new transaction or create or delete a view of data.

System R uses one universal language, SQL, for data base definition, user query, programmers and data access, thereby providing a powerful general-purpose language for interaction among data base developers. In comparison, different languages are used for data definition and data manipulation in the IMS language, Data Language/1 (DL/1). This causes complexity and miscommunication among various user groups.

SQL language statements are very powerful and flexible in data definition, which reduces programming and maintenance. Many different user views can be formatted at the same time, which, likewise, reduces data base maintenance requirements. IMS/VS DBD is a very complex language. It requires the definitions of many complex parameters and relationships, necessitating the creation of the data base administrator (DBA) position to support such extensive maintenance demands.

Language Support

The IMS/VS DL/1 is severely limited. Not a true programming language but an I/O language, it consists of DL/1 operations statements that direct programs to transfer data. Operations designated GET, INSERT, DELETE and REPLACE are DL/1 subroutines called by whatever programming language is used for application programming.

Looking at IMS/VS' data language in greater depth, we can see that it contains and supports some features that enhance its operations. The Program Communication Block (PCB) is the location of each program's view of where a part or all of a physical or logical data base is specified, otherwise known as the logical data structure.

The Program Specification Block is a collection of PCBs used by one application program.

IMS/VS operations are further refined by one other additional feature. The interface to the integrated data bases for both the application programmer and application user is simplified by the Product Development Communication and Control (PDCC).

Those portions of the application code that are common to multiple applications, such as input verification routines and segment layout, are eliminated from the application code, reducing programming and maintenance.

For IMS/VS language facilities to be most effective, one should be working within direct usage of predefined access paths in the data structure. Query logic quickly becomes more complex as indirect access paths are used. This limitation is often tedious for the user since predefined access paths may appear to

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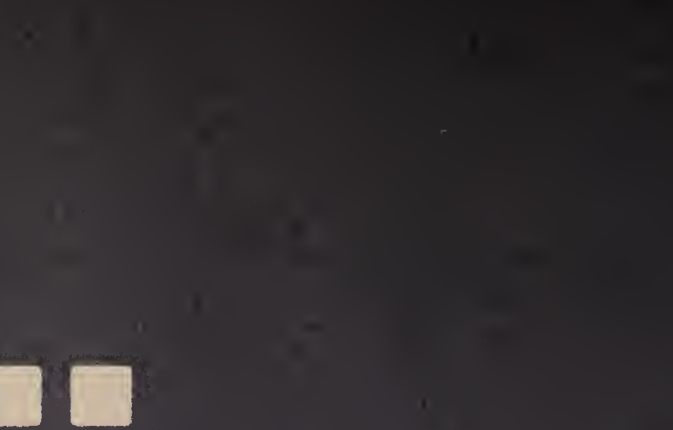

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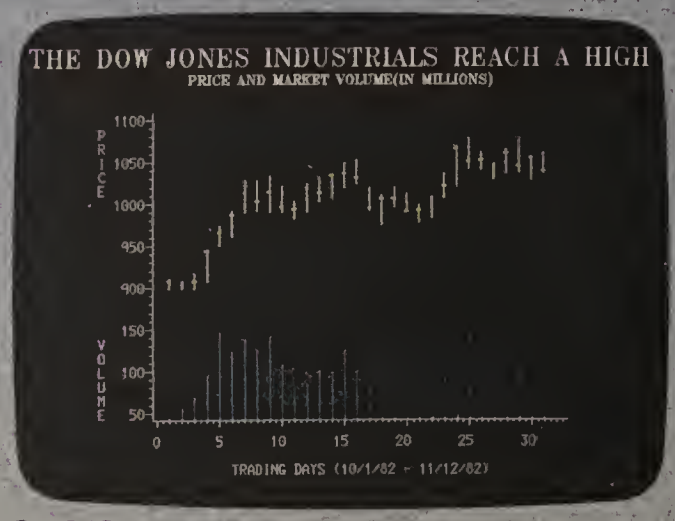

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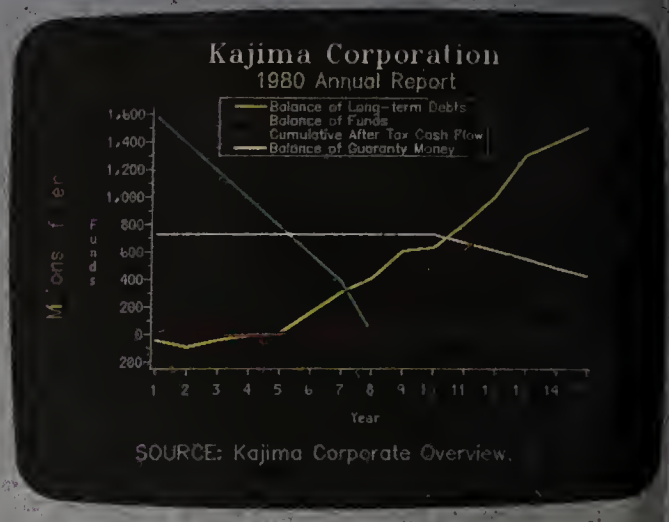

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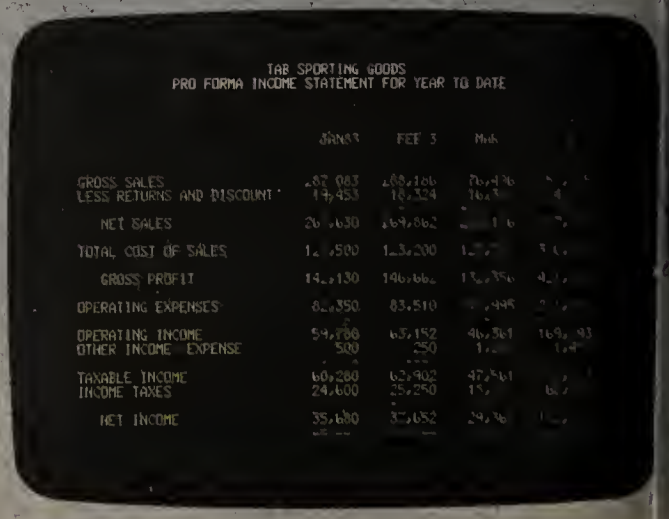

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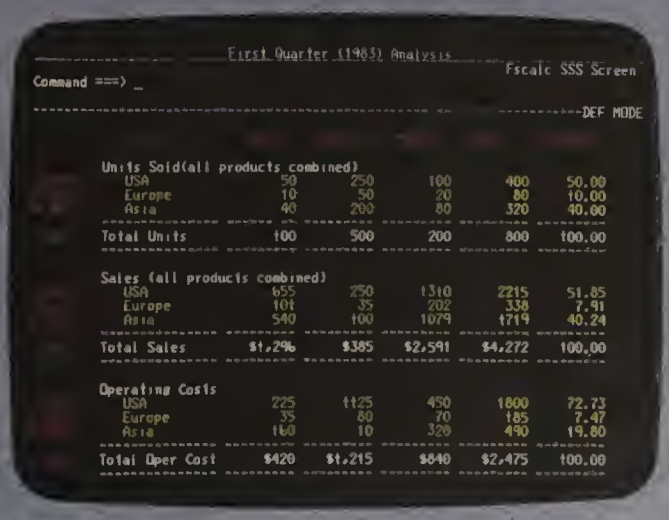

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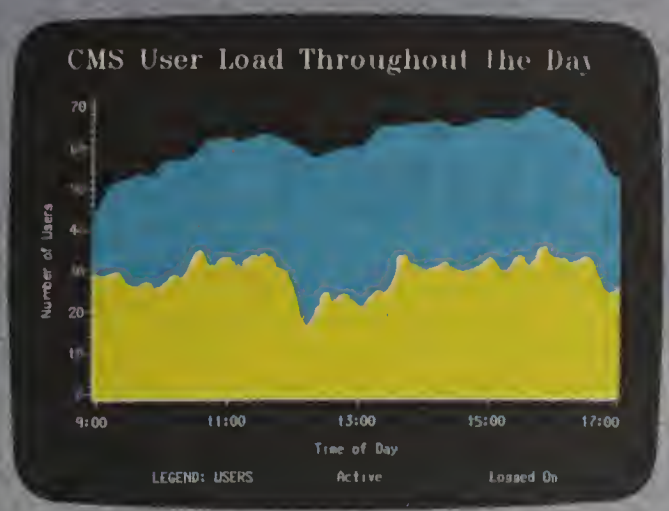

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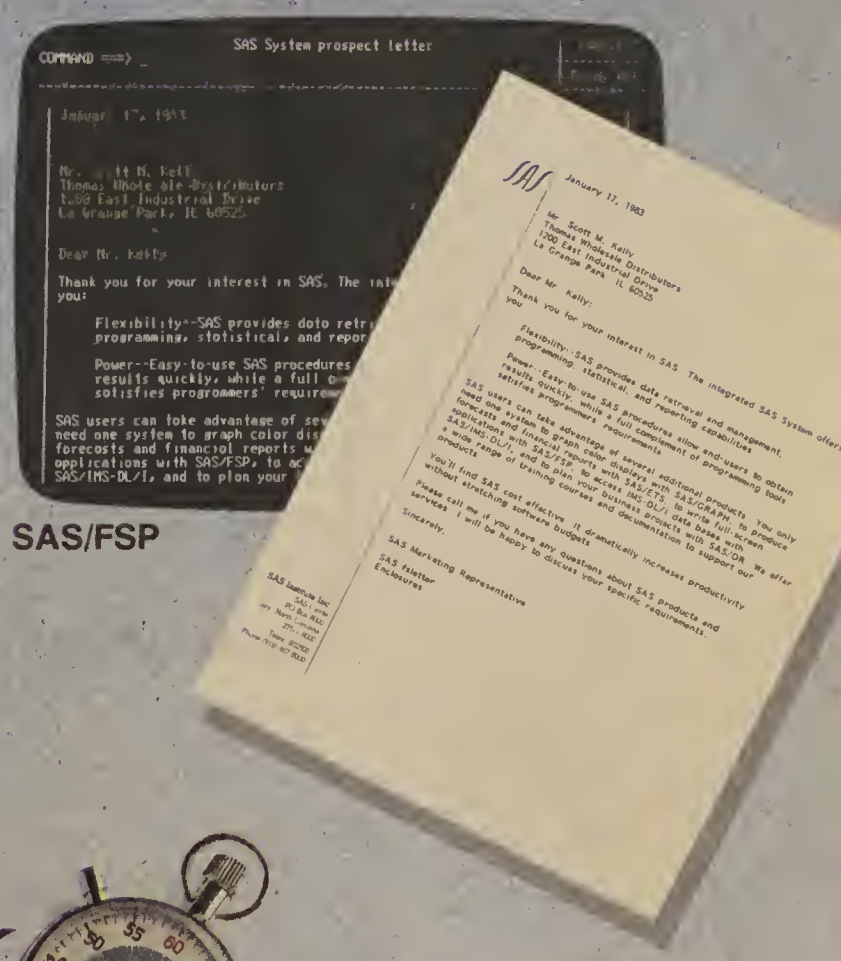

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be very complex and asymmetrical in layout.

By contrast, System R's data language, SQL, is entirely relational and algebraic in structure. Based on a relational data model, SQL can support definition, access and modification of multiple views of stored tables by providing specific select, project and join operations. SQL also manipulates sets of records. That is, it operates on tables as a whole. Also embedded within SQL are other set operations such as union, intersection and differences, which work on complete sets of records. In addition, there are special functions for summation, aggregation and ordering available in SQL.

Since System R employs a fully functional programming language through SQL, it is flexible in supporting the user's needs. Two types of query facilities are provided:

1. Queries that are executed only once, such as ad hoc queries and updates.

2. Canned query programs that are stored in a program library and have a high rate of execution.

SQL features include query, update, table definition and deletion, views or indexes and data base security. Following is an example of a SQL statement:

```
SELECT NAME
FROM PERSONNEL
WHERE OFFICE = SIOUX CITY
```

This statement presumes a personnel table containing the attributes NAME, OFFICE, JOB and SALARY.

SQL statements may be incorporated into a PL/I or Cobol program by prefixing each with a dollar sign ($). Following from this capacity, SQL statements embedded within a PL/I or Cobol program may contain host language variables, if the variable names are prefixed by a dollar sign. The PL/I or Cobol program gets the answer set from the SQL query by an open statement. This process binds the values of the host-language variables. A FETCH statement is then used repeatedly to get rows from the answer set inserted in the program variables.

The enhancements of SQL make it much more easily available to more users in more flexible applications than the I/O limitations of DL/1 can provide. The complexity of an IMS/VS DL/1 data base manipulation is caused by the multiplicity of concepts. Separate concepts are used when predefined paths of different types are required.

In SQL, however, additional programming logic is required when data must be accessed one record at a time. In some applications of this type, the DL/1 language is more efficient than SQL. Where explosion/implosion loops are required, such as for a bill of material, SQL requires several table operations, while DL/1 can process the same requirement with far fewer operations that build from its implicit hierarchical data structure. However, when operations involve set retrieval and updating, SQL makes them simple and straightforward.

Overall, SQL is a language designed to offer a symmetrical, simple, high-level interface for the query specifier, and it is generally more adaptable to many different applications than the rigid, heavily structured DL/1 language.

Data Dictionary

IMS/VS is justly famous for an additional, indispensable software package called the DB/DC data dictionary.

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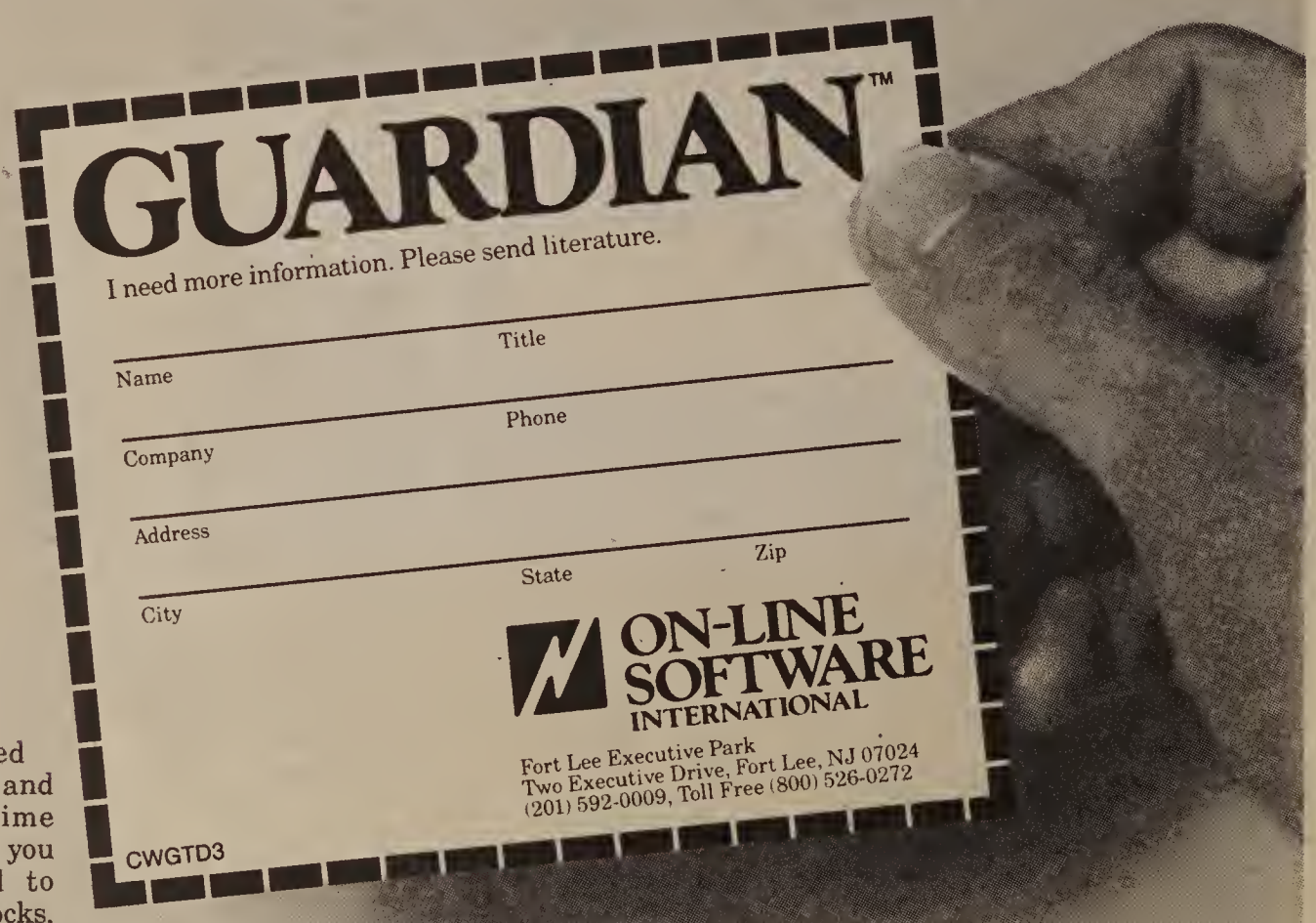

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IMS/VS vs. SYSTEM R

IN DEPTH

Providing terminal support and transaction management, the dictionary captures relationships between subjects and provides system security and recovery. Dictionary data is organized by category, and the different categories include data base, segment, element, PCB, system, job, program, module, transaction, PSB and DDUSER.

The user can also define his own categories. More than 50 different menus can be accessed, and dictionary reports are available to view any hierarchy, a glossary or a variety of displays, as well as single subjects.

SQL, by itself, is a powerful data definition and data manipulation language. System R's data dictionary capability is built within its language structure and, unlike with IMS/VS, it is not a separate system. The description of the data base is stored, based on user-visible "system" tables that can be retrieved using SQL language statements. When a new table is created, new entries are incorporated in the system tables. Users, when creating tables, are encouraged to add English text that describes the "meanings" of the tables and their columns. Other users may later retrieve all tables with specific attributes, or they may browse through the descriptions of defined tables.

SQL, by itself, is a powerful data definition and data manipulation language. System R's data dictionary capability is built within its language structure and, unlike with IMS/VS, it is not a separate system.

Since IMS/VS is a commercial product, its data dictionary is much more comprehensive. IMS/VS users are given a complete catalog. With all the complex interrelationships of the IMS/VS features, its data dictionary is required to monitor all of the user categories. Though the System R catalog is much more informal, it does provide data cataloging features. However, it does not now include transaction management of security and recovery features.

Data Base Integrity

IMS/VS currently features comprehensive facilities for backup, recovery, restart and transaction management. Data base recovery is managed by the user through the periodic reproduction of copies of the user's data sets and by recording the data base changes in the system log. When there is a failure in a data set, the data set is restored by the latest backup copy and made current by applying the transactions from the change log.

Recording data base changes in the system log is a process of identifying two segment images: "before segment change" and "after segment change." Also included in the process are the program name, the date and time, the data base identity and the record being changed. To facilitate the recovery of each data set, the utility performs the following: loads the latest image copy, reads the system log in time-ascending order to absorb all changed log entries and applies the "after" image to replace canceled data. Two utilities are available in the data base: image copy and data base recovery.

IMS/VS has established important technological enhancements in data sharing: the synch point concept and fixed-server transaction processing to facilitate transaction processing. In IMS/VS, the requirement of data sharing is controlled through the segment instance. As programs are updating, the same segment types can run concurrently; thus segments are acquired and released as required to prevent interferences. One or more programs may be terminated abnormally to resolve deadlocks over data resources, and the use of the synch point recovery facilities can then restart the terminated programs.

System R can accommodate multiple users accessing data simultaneously, and it provides complete facilities for transaction backout and system recovery. Most recovery data is stored on disk, and a nondramatic restart process is transparent to the user. A transaction in the context of System R is defined as a unit of work that may use several SQL statements. Partially finished transactions are erased by the system, but once transactions are applied, they are no longer subject to backout.

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Concurrency is controlled through the transactions. Because of System R's unique locking protocol, concurrent access to a data item functions without disruption. The user has full control in defining the isolation of each transaction, if required. Querying and deadlock detection are monitored by the locking subsystem.

The RSS transaction recovery is set in motion by begin and end commands. This feature initiates "undo" of all changes made by the transaction, including record and index changes, and all creation of new tables and indexes. Supporting this function, time-ordered list log entries are maintained. All entries are concatenated to include both old and new values of the modified entities. Very rapid recovery is continually provided through frequent checkpoints to sustain consistent data values, indexes and tables.

To support multiple-user access, locking techniques must be invoked to maintain system synchronization. Physical locking is controlled by setting and holding locks on one or more pages during the execution of an RSI operation. Logical locking is controlled by setting the lock on specific entities, such as segments, tables or TIDs, and holding them until they are explicitly released or until a transaction ends. By varying the lock duration, pages can be locked both for physical and logical functions.

Various levels of data consistency identify for the user his margin of control. Level 1 "dirty data," which has been updated by a still running transaction, may be read but not updated by a subsequent transaction. Level 2 "clean data" means that the transaction that established the value is concluded, but there is no assurance that a next access will result in the identical value. Level 3 offers the logical equivalent of a single user. No one user accessing the system can know if other users are simultaneously accessing and updating the data base.

Again, proper locking techniques ensure that the system functions efficiently. Locks are requested dynamically during transaction wait time while a matrix of waiting users is checked. During this check, deadlock cycles are identified.

The oldest transactions are then obliterated by the system.

As a research program, System R provides both new ideas and experimental techniques. Its extensive transaction management facility can enhance future research applications. This system differs from IMS/VS in that its restart facilities are managed by the RSS rather than the main operating system. In addition, System R facilities, as an advancement, feature options that are streamlined and simplified, whereas IMS/VS installation personnel must acquire in-depth knowledge and take precautions to certify proper and smooth system operation.

Security Features

Both IMS/VS and System R have built-in processes to limit and adequately authorize data access. The IMS/VS system provides for the isolation of "sensitive" fields within "sensitive" segments. This "sensitive segment" feature protects physical data base growth. Through the program communication block, the processing options are specified. Types of segment operations allowed are identified in the "PROCOPT" entry. Entries can be limited to retrieval-only or insert, replace, delete or any combination thereof.

The System R user views offer a powerful authorization mechanism. One may limit table access to a row and column subset view for a single, cited user. In addition, identified columns of a view may be limited as "read only." Data base access authorization is established and, if required, perpetuated through the "grant" operation. Both systems have equivalently powerful authorization/authentication security-level features, including audit-trail facilities.

Data Independence

IMS/VS possesses only a limited system for data independence. Some operations do not always require recompilation of existing application programs, such as adding new segment types at certain points, adding new fields, selecting different pointer options and changing the division of a data base into data set groups.

A most positive enhancement of the relational DBMS, like System R, is the very highest level of data independence. A specific access path or the physical layout of data need not be stated as part of data access or update. For obvious reasons, the application programs are then much less complex than those of IMS/VS, and the data management system can operate efficiently to select the best

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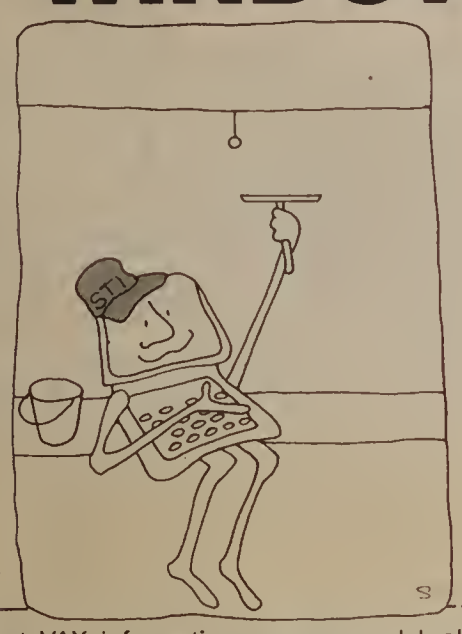

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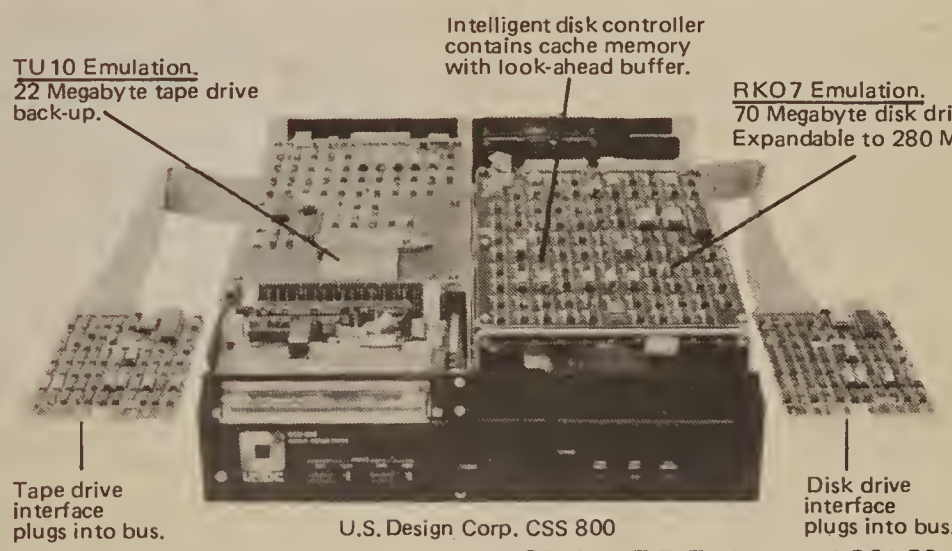

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strategy for program execution.

As discussed earlier, the System R optimizer determines the best strategy to minimize the cost of SQL statement execution. Cost is factored from estimates for CPU and I/O requirements. Storage is not a continuing user concern since the System R program remains in-function as the underlying storage structures evolve over time.

System R supports greater data independence. Users are explicitly aware of all fields. Tabular operations are not dependent on predefined access paths. And, of course, data structures are not defined and constrained by physical attributes, such as concatenated logical parent fields. However, large shared data bases that support several different applications may require specialized language constructs to function efficiently. One very obvious feature of IMS/VS is its reorganization requirement when new data elements are initiated.

User's Environment

The user environments of IMS/VS and System R are immediately contrastable. The explicitly defined access paths of IMS/VS guide the user through the system without extensive tabular operations. A weakness of System R is its inherent performance inefficiency in supporting user proficiency in a more flexible environment. Without user-defined access paths, systems operations are more costly. And the performance of the tabular operation may not be acceptable. Relational operations are, it should be noted, very powerful and easy to grasp and use. What is desired as the end result can be defined much more directly in relational operations, instead of rigidly and mechanically confining the user to defining the process for a desired result, which is the required burden of IMS/VS.

Some current enhancements in specialized hardware, such as associative processors or logic-per-track devices, could substantially streamline relational data base operations.

For users who are not proficient programmers, the tabular views of System R afford the most forgiving flexibility. But for the programmer, much more program structuring is required in System R than in the hierarchical asymmetrical languages of IMS/VS. Where set retrieval or update is required, the relational view can simplify programming.

The data base administrator is challenged by the same responsibilities in each system. Storage options must still be specified, operation procedure must still be maintained and overall performance must be monitored. System R simplifies the interfacing with external and internal definitions. Effective design, like normalization, is required of either system, but the clear, simple interface with the user allows good System R design to be much easier.

Other Facilities, Features

IMS/VS is associated with several utilities and aids. Only the major supporting components will be described in this section. The Data Base Definition Generation (DBD Gen) utility generates the control blocks for programs to process data from the data base which describe the various physical and logical data bases from the DBD statements. The Program Specification Block Generation statements describe the characteristics of data bases and terminals required by a particular application program. The System Log Analysis provides statistical reports on terminal operation and transaction type analysis.

Data Base Image Copy and Recovery utilities drive the "unload" and reconstruct the data base. Assistance in the generation of display and message formats for IBM CRTs is supplied by a number of utilities called Message Format Services. The Data Base is used to create a data base and to run batch application programs. The Application Development Facility aids in application programming.

The highly developed Data Communication feature contains programs to control the teleprocessing network. It schedules the appropriate application programs required by incoming messages and provides access to the IMS/VS data base. The Index Data Base features direct access to the physical data base by data values. In an index data base, the record type is contained in a single root segment type. The Data Entry Data Base is a sequential dependent data base for storing a large volume of off-line data to be processed later in batch.

Many of the utilities and aids of IMS/VS described above have become a standard part of other DBMS, based on their successful implementation in this system.

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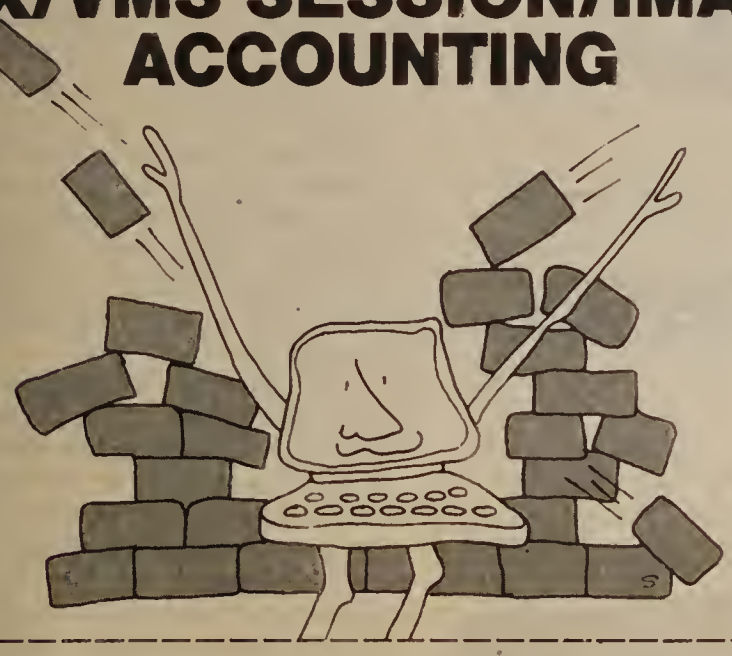

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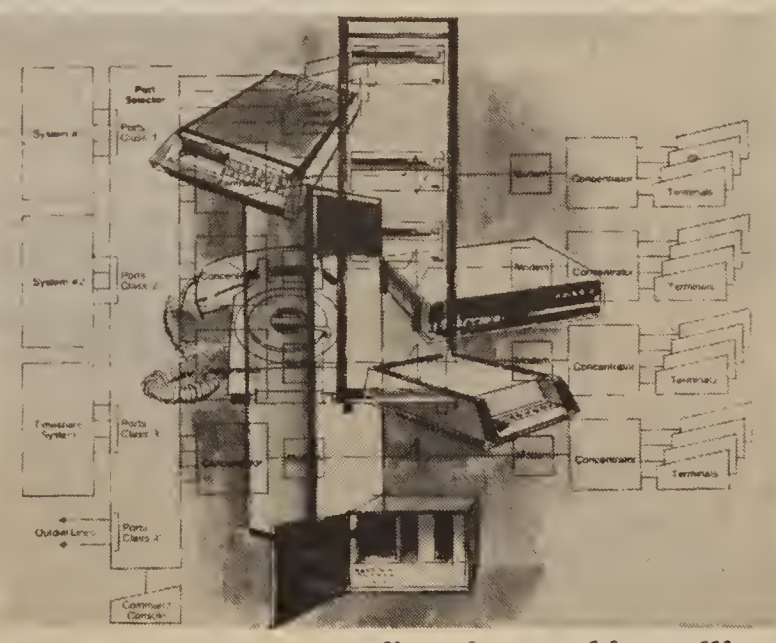

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IN DEPTH

required. System R is the product of work initiated in mathematical formalism, and it has a theoretical foundation. Its development supports its main objective: to provide a DBMS where relational requests may be easily implemented and optimized.

Since System R is an experimental DBMS, a few of its features are unique. It is driven by the Relational Data System (RDS). In RDS, host-language programs are precompiled and installed as "canned programs" by an innovative precompiler called Xprep. Activation of these canned programs is driven by XRDI, an execution system that also executes the SQL statements for ad hoc requests. Xprep, as part of its function, converts SQL statements in the program into a machine language, identified as the "access module." Replacement of these SQL statements is effected by host language calls to the access module.

In System R, the execution process for a canned program involves calls to the XRDI, which causes the access module to load for the program. The access module also interfaces with the RSS to effect operation on the data base.

A most attractive feature of System R is the User-Friendly Interface (UFI). The UFI mainly supports dialogue and display, providing guidance to ad hoc users. The UFI access module transfers control to the XRDI for SQL statement execution. The System R RSS possesses an automatic locking system which "traffic-signals" these simultaneous activities.

When commercially released, System R will be associated with several utilities that will support a production environment. Because it is still an experimental product, its current interfaces with other facilities are not a matter of demand or concern.

Performance Improvements

IBM will continue to optimize System R with hardware advancements in the areas of logical processing storage devices and central processing units with even greater artificial intelligence in data management. These improvements will substantially overcome the major problems in providing a higher performance rate.

Before we see the true System R, several interim products will be released as part of a slow migration to the relational DBMS. Most of these products will share data with IMS/VS.

As time lapses before we see the true System R, several interim products will be announced and released as part of a slow migration to the relational DBMS. Most of these products will share data with IMS/VS. IBM recently announced the release of Data Base 2 (DB2), which extends and facilitates a relational data model. In DB2, data operations are controlled and supported by SQL. The interface between IMS/VS and DB2 is accomplished by the Data Extract program. Data is extracted from the IMS/VS data sets and loaded into the DB2 data base from user query. In addition, DB2 is supported by the Query Management Facility, which simplifies application programming, enhances productivity and can be easily used by end users for data base query.

The release of ever-advancing interim relational data base products will protect customers from the sudden shock of new methodologies — not to mention the trauma of high costs, re-education and conversion. Time will allow for development of a truly superior relational DBMS.

IBM will market System R when it is shareable and compatible with IMS (hierarchical) applications. This does not mean that the systems will function on the same data sets. The problem with integrity and deadlock will be substantial.

The relational DBMS will control and support interfacing IMS installations until they become obsolete. The careers, concepts and dollars committed to IMS/VS should sustain it through this decade.

About the Author

Monica Ajmani Hickey is a data administrator at Lockheed Missile & Space Co. in Sunnyvale, Calif. She has 13 years' experience in data base administration and information management systems planning, design and development, both for government and private industry.

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Administrative, Clerical Staffs Targeted

OA Focus Said to Ignore Managers' Needs

By Jerry A. Klein
Special to CW‡

Attention focused on the data, word, voice and image processing and networking aspects of office automation has virtually ignored the needs of management. Almost all the hardware, software and services have been developed for use by administrative and clerical staffs.

Yet management executives, all the way to the chief operating officer, must still integrate data and make decisions. These people spend up to 75% of their time communicating at many levels within their organizations — with superiors, peers and subordinates, with off-site staff and with financial or research organizations inside and outside their own jurisdictions.

Much of that time is wasted because of inefficient communications capabilities and because many OA technologies and procedures are not tailored to the management task.

Lack of effective communications has produced so-called "telephone tag," which leads to a bloated "information float" causing delayed or incorrect decisions. Lack of proper technology has caused the abandonment of rigid, inappropriate OA that demanded unacceptable changes in management style.

Until the advent of OA technologies, the telephone was only a voice-to-ear link, a small percentage of the communications decision process. Now the new communications technologies of OA — based on personal computers and terminals linked with an emerging family of digital switches — promise to change dramatically the way business people communicate at every level.

'Office automation includes core data and word processing capabilities in the typical workstation that incorporate varying degrees of intelligence and memory, supported by peripherals and made powerful with software. It must also disseminate these results for managers. Advanced communications techniques must be integral to OA.'

OA is integrating voice, data, text, graphics, images and video, but these new tools have been presented in so many forms (with other new offerings to come) that buyers must become increasingly informed and selective if the right configuration is to be attained.

Dramatic End Results

The end results for individuals and organizations will be dramatic: Information will become available immediately; managers will be able to review and discuss plans and projections contained within the OA system with other offices within a plant or around the world as easily as if the individuals concerned were sitting in the same room; and access to individuals needed for project discussion will become almost instantaneous, no matter where they may be.

Office automation includes core data and word processing capabilities in the typical workstation that incorporate varying degrees of intelligence and memory, supported by peripherals and made powerful with software. It must also disseminate these results for people to use — especially managers. Therefore, advanced communications techniques must be integral to office automation.

Since no accepted definition exists for OA, with user goals varying from group to group based on the need for productivity as defined by that group, highly flexible characteristics and communications elements are vital.

Communications become harder and costlier with distance. The result is that managers who must control geographically dispersed activities and people — regional, national or international — face tough communications challenges complicated further by time zones and obsolete equipment.

An average of four telephone calls is needed to reach a staff member in another time zone, prompting the term "telephone tag." Traditional mail may be delayed hours or a few days (optimistic) to as long as a week (realistic). Even telegrams, intended to compress these delays albeit at high cost, are delayed by internal distribu-

(Continued on Page 54)

Wang Updates VS Mini, Micro, Plans Wang Office-Disoss Link

LOWELL, Mass. — Wang Laboratories, Inc. has announced several enhancements to both its Professional Computer and its VS minicomputer.

Wang also announced its intention to produce within one year an interface between Wang Office — Wang's network-based office automation package — and IBM's Distributed Office Support System (Disoss).

The interface will reportedly allow Wang systems running Wang Office to share information with IBM systems supported through Disoss. Information flow between Wang and IBM systems will reportedly be bidirectional.

Among the announcements for the Professional Computer were:

- The Wang Professional Computer Multistation, said to allow users to further integrate Wang Professional Computers with VS systems by enabling the Wang micro to use the VS multiple-window display facilities. The Multistation is said to provide capabilities such as simultaneous task support, data transfer between tasks, simultaneous views of multiple applications, virtual disk storage for Professional Computers, improved use of resources, consistent data between users and centralized backup. Available in March 1984, the Multistation is available for a license fee of $295.
- The addition of Microsoft, Inc.'s Windows to the Wang Professional Computer's MS-DOS operating system, said to allow Professional Computer systems to employ multiple-window display techniques and mechanical point devices in an operating environment that reportedly permits users to run multiple applications concurrently. Microsoft Windows will be available in the second quarter of 1984.

(Continued on Page 54)

Point 4 Introduces System Featuring WP, E-Mail

IRVINE, Calif. — Point 4 Data Corp. has introduced its Point 4 Electronic Office System, said to feature word processing, electronic mail and an electronic calendar.

The electronic mail capabilities reportedly provide a method for sending notes, memos, entire mailing lists and other documents to one or more individuals. The electronic calendar is reportedly configured to resemble an executive's day planner. The system requires Point 4's Iris operating system. Future enhancements to the system will include an electronic note pad and electronic files, a spokesman said.

Priced at $2,000, the system is available from Point 4 Data at 2569 McCabe Way, Irvine, Calif. 92714.

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OA Focus Ignores Needs of Management

(Continued from Page 53)

tion delays. These are the ingredients of the information float.

Obsolete data degrades management decisions and actions, made worse when "round trip" data must precede decisions. Improved communications are the key to addressing these intolerable delays.

In modern offices implementing OA via personal computers, a range of peripherals is emerging to address these high-priority needs. Black-box additions are finally giving way to intelligent and integrated systems based on new technology that fundamentally changes personal computer architecture.

There is a further choice for managers implementing new OA systems, depending on the size of the company, the availability of fully integrated systems already in place in some organizations or the presence of personal computers being used in stand-alone mode by individuals within the organization.

Regardless of the choice, communications delays can no longer be permitted to degrade the quality and timeliness of management decision and action. Improved communications remains the critical path to improving management efficiency.

What is needed is the desktop integration of voice and data. Desk-to-desk teleconferencing, either with interleaved voice and data on a single line or simultaneous voice and data on two lines, plus screen mail provides:

- The ability to send and receive electronic mail without interrupting the user's other activities.
- An intelligent electronic telephone with autodial directory, speed dial, hands-free speaker and speakerphone option.
- Automated data base access and terminal emulation.
- Single-button, user-programmable keys for the popular long-distance interconnect services.
- Communications management, in which the system automatically logs all telephone calls and electronic mail for time, data, ID and duration of incoming and outgoing calls.

The information float is collapsing as OA advances. This collapse is bringing the future management wave closer.

Not all managers have comprehended these momentous changes, but sooner or later they will make the discovery — to their advantage or disadvantage.

Klein is vice-president of marketing at Cygnet Technologies, Inc. of Sunnyvale, Calif., which markets executive workstations.

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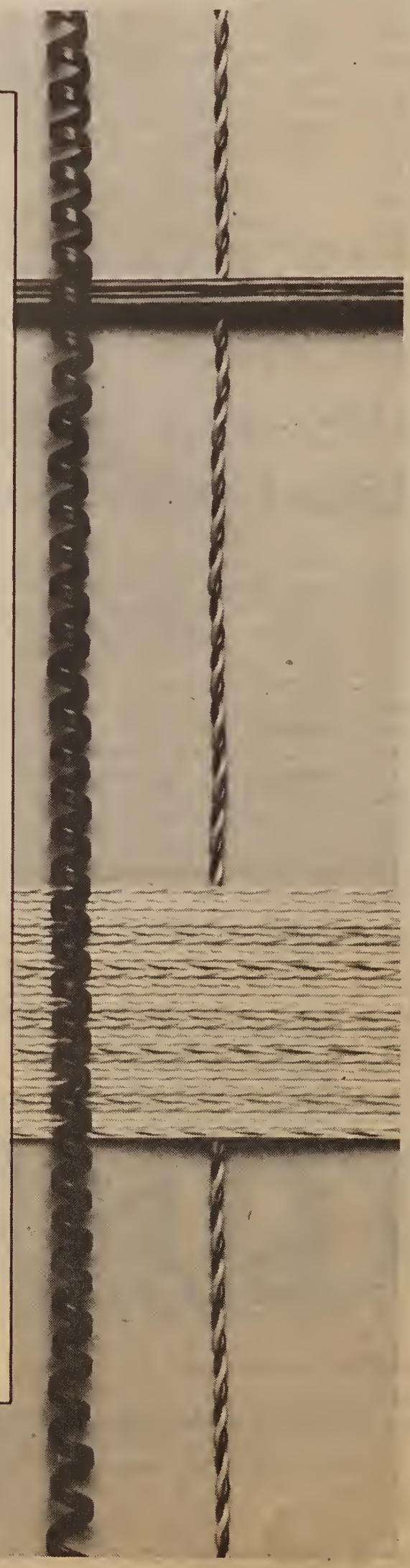


Wang Updates Micro, VS Mini, Plans Interface

(Continued from Page 53)

The mechanical mouse attachment will be sold for $215.

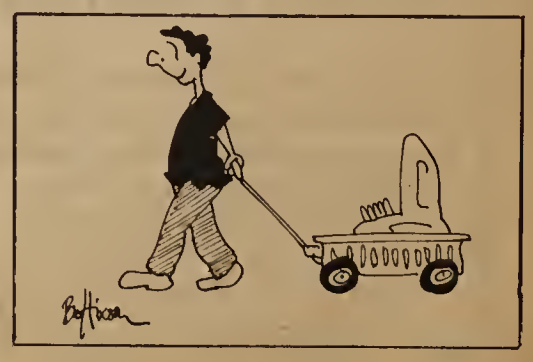
- Professional Computer Basic-2, a compatible version of Wang's 2200 Basic-2. Professional Computer Basic-2 is said to be a high-level programming language designed for interactive programming on the Wang micro. Professional Computer Basic-2 will be available in the second quarter of 1984 for $395.
- An Advanced Professional Computer Basic Compiler, said to complement the Basic Interpreter, which is included as standard software with the Wang Professional Computer. The Basic Compiler reportedly increases the level of development support available to users as well as the conversion of software written for other microcomputers to the Wang Professional Computer. Advanced Professional Computer Basic will be available in the second quarter of 1984 for $295.
- Digital Research, Inc.'s CP/M 80 Emulation Software, said to allow Wang Professional Computer users equipped with the Local Communications Option Card to access an optional operating system, programming languages and application programs. CP/M 80 Emulation Software is available immediately and priced at $240.

Announcements for the VS include:

- The VS Multistation, a software tool said to transform a VS terminal into a personalized workstation, enabling users to run several applications at the same time. VS Multistation reportedly operates in conjunction with the Professional Computer Multistation. Available in January 1984, the one-time license fee is $3,000.

The enhancements for the VS 25 and VS 45 minicomputers include a 9-track tape drive, a 76M-byte fixed disk drive and a two-port data communications controller, according to the vendor.

More information is available from Wang at One Industrial Ave., Lowell, Mass. 01851.



MS-DOS Seen Key To Unlocking Compatibility

By Tim Caffrey
And Tom Wilmott
Special to CW‡

Second of two parts on the IBM Personal Computer and the markets it has spawned.

A key element of plug compatibility is the ability to incorporate the IBM Personal Computer's operating system, Microsoft, Inc.'s MS-DOS, on plug-compatible machines.

Microsoft is free to license the use of its operating system to vendors other than IBM and has done so with such machines as Eagle Computer, Inc.'s Eagle, Corona Data Systems, Inc.'s personal computers, Compaq Computer Corp.'s Compaq and others.

While the presence of MS-DOS on a machine is essential for plug-compatible manufacturers (PCM), it does not guarantee complete compatibility. Each version of MS-DOS that Microsoft ports to different computer models is customized to accommodate specific architectures.

Programmers eager to exploit the symbiotic potential of portable operating systems such as MS-DOS have two options. They can either use generic MS-DOS operands to design a program that will run equally well on an IBM machine or one of its plug-compatible competitors, or they can circumvent MS-DOS commands to achieve particular efficiencies.

Transportability Lost

An example of the latter is Lotus Development Corp.'s development of a version of 1-2-3 specifically for the Personal Computer. Lotus clearly benefited by producing a product designed for the unique design of the Personal Computer. What it gained in efficiency, however, it sacrificed in transportability.

As Microsoft continues to develop and refine the power of MS-DOS, applications developers will have more freedom to write programs for a larger audience, and the question of degrees of compatibility will become less problematic. As the market stands today, no (personal computer) machine can be a 100% IBM look-alike, simply because IBM has protected parts of its design by law. Potential PCMs can study publicly available designs, but they cannot legally duplicate them. An analagous situation would be to show the competitors an easy route and

(Continued on Page 60)

For Increased Efficiency

Further Honeywell Cuts Seen

By Robert Batt
CW West Coast Bureau

PHOENIX — The relentless pressure to improve price/performance capabilities will force Honeywell, Inc.'s Information Systems into further radical cost-cutting measures, according to one of its senior executives.

In a recent interview here, Deward Manzer, vice-president and general manager of Honeywell's Large Computer Products Division (LCPD), said further cutbacks in the division's work force cannot be ruled out.

"Competitive price/performance improvements mean that we are increasingly being forced to look for new ways to increase cost-effectiveness and organizational efficiency. This requires the elimination of overhead costs, and this is what the cutbacks in our staff have been related to," he explained.

In October, Manzer announced that LCPD, which designs, manufactures and manages Honeywell's large-scale DPS 8 and DPS 88 product lines, will reduce its work force by 13% — or 500 of its 3,800 employees — by year-end. This follows a similar cost-cutting campaign in 1982, during which the division laid off 1,800 people out of a total work force of 22,000.

Manzer said the division's strategy now is to become more efficient in the areas of research and development, manufacturing and marketing of its products, in response to competitive forces and in anticipation of stiffer competition to come, particularly from IBM.

This will be no easy task. The company, which has an installed base of 2,000 large systems users in 40 countries, recently announced a nearly 25% drop in earnings for the first nine months of the year to $139.3 million, compared with $184.9 million last year. Third-quarter results, however, showed a marked improvement totaling $58.4 million, a 33% rise over the same period in 1982, which the Honeywell executive attributed to the previous cost-cutting measures.

End-User Focus

"We are currently focusing our research and development efforts on the world of end-user application development and productivity tools. Our emphasis is on software tools that will help sell complete systems," Manzer added.

He affirmed that the recent cross-licensing deal with Japanese manufacturer NEC Corp. is a portend of things to come. Under the terms of the deal,

(Continued on Page 62)

Apple Forecast Shows Rough Weather Ahead

By Robert Batt
CW West Coast Bureau

GREENWICH, Conn. — The future for Apple Computer, Inc. is one fraught with dangers and difficulties that would overwhelm an ordinary company, according to a report just published by Enterprise Information Systems, Inc. (EIS).

The report, titled, "The Apple Report: A Comprehensive Analysis," stated, however, that the Cupertino, Calif.-based personal computer manufacturer is no ordinary firm, and it is too early to conclude that it will drift into obscurity.

Nevertheless, the report noted, the Apple organization contains major weaknesses which could slow its growth over the rest of this decade. "The most serious weakness is the capability of Apple to market and sell to the medium and large organizations. Currently neither the dealers nor Apple's direct sales force are particularly experienced or knowledgeable in the vagaries of this marketplace," it stated.

There are also weaknesses in Apple's current product line, the report asserted, including no current support for Microsoft, Inc.'s MS-DOS operating system, which, the report maintained, is evolving as an industry standard, and a lack of a low-priced home computer, a multiuser system and networking capability.

The company's Applenet product is currently intended

(Continued on Page 62)

Televideo Outlines Micro Strategy

By David Myers
CW New York Bureau

NEW YORK — With IBM gobbling up between 45% and 80% of the market for personal computers, Televideo Systems, Inc. would be happy for some share of the remainder, according to a company executive.

Richard Dubridge, vice-president and chief financial officer of the seven-year-old market leader in display terminals, reported to a gathering of securities analysts here earlier this month that Televideo shipped its first IBM-compatible 16-bit microcomputer earlier this month.

"We believe that in the 16-bit world, PC-DOS [the IBM operating system software] will be the standard you must adopt to succeed in the market. A manufacturer which designs a computer system with a proprietary operating system is living in the past," Dubridge declared.

Next month, shipments of the IBM-compatible portable machine, a product designed to go head-to-head with Compaq Computer Corp.'s 30-lb portable, will begin in volume, Dubridge told analysts.

'Because of the heavy demand for IBM Personal Computers and compatible machines, a demand the microcomputer industry isn't meeting because of a squeeze on manufacturing capacity, the widely heralded shakeout is still 12 months off, Dubridge said.'

After personal computers and portables, Televideo intends to attack four different markets:

- Video display terminals, where Dubridge said the Sunnyvale, Calif.-based company sees its major competition coming from Digital Equipment Corp., Lear Siegler, Inc. and Applied Digital Data Systems, Inc.
- Multiuser microcomputer systems, where Dubridge said Televideo passed Altos Computer Systems, Inc. as the market leader one year ago.
- Computer printers, where Dubridge said the leading rivals are Diablo Systems, Inc. and Qume Corp.
- A new product area Dubridge said Televideo is pioneering, which is called the "personal terminal."

"It will be a status symbol on an executive's desk," Dubridge said, explaining that the high-resolution terminal was designed to afford access to on-line data bases. As yet, the company has no competition in that market, according to Dubridge.

But the computer maker's chief financial officer insisted that Televideo saw its "biggest opportunity" in the market for equipment that is compatible with the IBM Personal Computer.

Dubridge said he glimpsed little in the way of IBM-compatible hardware at the Comdex/Fall '83 show in Las Vegas last month. Neither DEC nor Hewlett-Packard Co. has announced personal computers that are

(Continued on Page 56)

Sonecor Invades New England Telephone Area

BURLINGTON, Mass. — What is thought to be the first invasion by an independent operating company into the territory of a Bell operating company took place last week when Southern New England Telephone Co. opened an office here — in a New England Telephone region — for its Sonecor division.

After divestiture, New England Telephone will be combined with New York Telephone to form Nynex and will compete with Sonceor.

With the intent to offer value-added voice and data switches, Sonecor will market communications equipment from Codex Corp., GTE Corp., NEC American and NEC Information Systems, Northern Telecom, Inc., Wang Laboratories, Inc. and others. Sonecor's communications software and services such as maintenance will also be offered eventually, a spokesman said.

"Our customers can get as much or as little service as they want," said Alfred Van Sinderen, Sonecor's chief executive officer. "They don't have to pick and choose from a bewildering array of communications and data processing components. They don't have to worry about installation and maintenance unless they want to."

Premier among Sonecor's value-added systems is the Neax 2400 advanced private branch exchange (PBX), which is renamed the Sonecor System 2001 when marketed by Sonecor. The 2001 is designed to switch data and voice and serve as the hub of the automated office, the spokesman said.

Sales representatives present at the office opening identified the added software as the major advantage of the 2001 over the Neax.

Sonecor officials stressed Southern New England Telephone's long experience with voice lines, but were careful not to promise superior access to the local loop or long-distance lines.

"Our knowledge and depth of experience are our trump cards," said Warren W. Raynor, general manager of Sonecor Systems.

Stressing service, Sonecor's print advertising will state that "Boston hardly needs another manufacturer of communications equipment," Raynor said.

Televideo Outlines Strategy

(Continued from Page 55)

compatible with the IBM Personal Computer, he pointed out.

Dubridge estimated that IBM's eventual share of the personal computer market would wind up somewhere between its 45% piece of the video display terminal field and its 80% hold on the mainframe world. But that does not mean there is no room for competitors, he added.

"Compaq was successful not so much because [users] wanted portables but because they wanted something that was available and cheaper than the [IBM Personal Computer]," Dubridge said, referring to the Houston-based leader of the portable mart.

Because of the heavy demand for IBM Personal Computers and compatible machines, a demand the microcomputer industry is not meeting because of a squeeze on manufacturing capacity, the widely heralded shakeout is still 12 months off, Dubridge said.

"The industry is simply short of products. That means anybody with a decent product can sell it over the next 12 months. Dealers will take on several [IBM-compatible] vendors now and wait a year to see who the winners are," he said.

Because of product shortages, price competition will not heat up for at least a year, according to Dubridge. After that, a rival will have to undercut IBM by 15% to 20% to remain competitive, he said.

But compatibility does not mean a manufacturer has to turn out machines that look, smell and act exactly like the Personal Computer, Dubridge said.

To Prevent Severe Cash Crisis

Micro Makers, Sellers Told to Manage Strictly

By Robert Batt
CW West Coast Bureau

LAS VEGAS — Personal computer manufacturers and independent sales organizations must adopt rigorous management techniques if they are to avoid the severe cash crisis now facing several firms, attendees at the recent Comdex/Fall '83 exposition here were told.

Speaking at a session titled "Cash Crunch Management," William Gustin, partner in the Los Angeles-based accounting firm Nelson, Gustin, Brandlin & Cheatham, said it is important to draw up contingency measures to deal with setbacks such as a drop in sales.

"To avoid a cash crunch requires constant self-evaluation and identification of the telltale signs of an impending cash-flow crisis. It is important, for instance, to know the productivity of your assets and what resources it is taking to generate them," he asserted.

Firms faced with a severe cash crunch, he said, should resort to outside financing, look for higher profit margins and develop better information systems to speed collections, reduce inventory and keep overhead costs under control.

Companies that are in deep trouble should create a "survival budget," he suggested. They should examine every cost and all product prices and should aim for a 10% to 15% return on investment. This may require having access to daily and weekly, as well as the normal monthly, information about the company, he contended.

Also speaking at the session, Mark Singleton, president and chief executive officer of Complete Office Information Networks, a Norcross, Ga.-based manufacturer of financial software packages, emphasized cost cutting as the only way to improve profitability at a time of crisis.

"You cannot sell yourself out of a cash-flow problem. It only makes matters worse," he told his audience. "You need to focus on cash, not the profit-and-loss statement. If you concentrate on the bottom line, you will run out of cash long before you can improve profits."

Cutting costs, Singleton said, is typically a dirty business, because nobody likes to fire employees and make structural changes.

Organizational analysis lies at the heart of cost cutting, he claimed, and includes:

- The need to discover the number of people that managers can effectively manage.
- The setting up of proper reporting levels so the biggest spending departments report to senior management. "Surprisingly, this is often not the case in troubled organizations," he said.
- Streamlined management, in which the layers of authority within a company are minimized.

"Most successful companies have relatively clean and simple organizational structures, because you can get things done a lot more quickly with less managerial layers," he asserted.

Our 3000 family of printers has an impressive list of features. But the most prominent new change on our printers is our new name.

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So the GE 3000 family is now the Genicom 3000 family. But while the name has changed, the product retains its established superiority.

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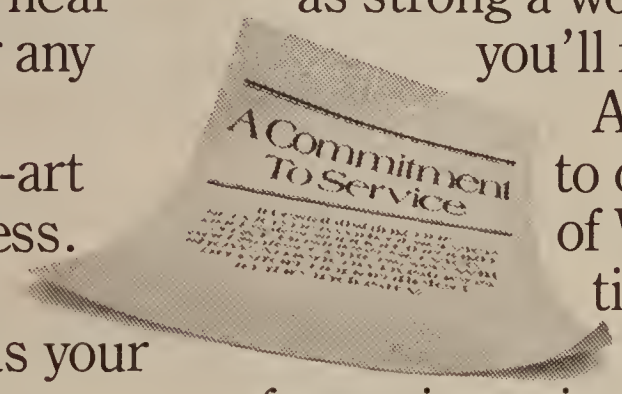

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MS-DOS: Its Role in Unlocking Compatibility

(Continued from Page 55)
then tell them they cannot take it.

The market does not sink or swim on the issue of plug compatibility alone, however. Users have begun to suspect the long-term financial viability of PCM vendors and have raised other questions of technical compatibility. For example, they wonder if linking the devices to local-area networks is worth the risk, when the potential cost savings is only a matter of a few hundred dollars.

'IBM will enjoy the benefits of continued market momentum. Based upon decision-making cycles in large organizations and upon the dynamics which we have described at length, we can anticipate continued penetration by the Personal Computer.'

Obviously, this risk is greater in large organizations where the management information systems planner senses that personal computers must quickly become a window on a larger distributed resources net. The unwillingness of consumers to risk losing the advantages of software and peripheral support by selecting non-IBM products is a key element.

Another look-alike strategy has been used by established vendors who enhance machines of their own design to emulate the Personal Computer. The rationale behind this approach is to allow potential users to take advantage of the existing base of IBM-oriented application packages, while also gaining compatibility and migration paths within the vendor's environment.

This strategy accepts as a base premise that the software, not the hardware, is the key to product success. Examples of this hybrid strategy are the Wang Laboratories, Inc. personal computer, which was originally designed to run MS-DOS, and the Digital Equipment Corp. Rainbow, which has recently been enhanced with the MS-DOS operating system.

So what will be the course of future events in the microcomputer market? First of all, it seems apparent that IBM will enjoy the benefits of continued market momentum. Based upon decision-making cycles in large organizations and upon the dynamics that have been described at length, one can anticipate continued penetration by the Personal Computer.

IBM might introduce more powerful processors at a higher price after having established itself in the low-end markets.

What of future products from competing vendors or from IBM itself? Keep in mind that to date, with Commodore Business Machines, Inc. as a possible exception, no vendor has had a follow-up product as successful as its first. So given the fact that present dominance is no guarantee of future success, what will characterize the next microcomputer phenomenon? We propose that this product will be the next smashing success:

- A workstation based on the Motorola, Inc. 68000 microprocessor. The cost of producing such a device is quickly becoming justifiable.
- The workstation will run the Unix operating system. At this time it appears that no vendor's proprietary operating systems will dominate the multitasking, multiuser requirements of the future, except perhaps that from AT&T.
- The workstation will cost between $6,000 to $7,000 and will include a high-resolution, black-and-white CRT; 500K bytes of main memory; and 30M bytes of Winchester disk storage.
- Variations of the operating system will permit access to files and computing resources around the network. Communications capabilities will be critical to the success of the device.

Caffrey is market research analyst and Willmott is director of user programs at International Data Corp., Framingham, Mass.

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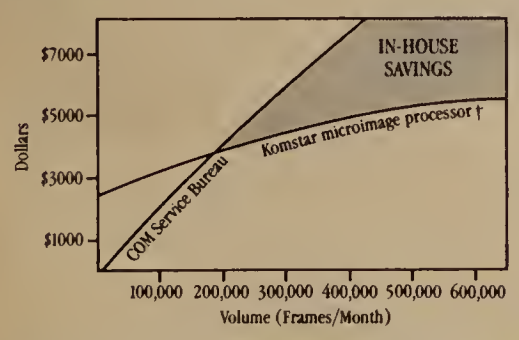

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Apple's Reputation Could Save Its Skin: Report

(Continued from Page 55)
only as a link between several Apple computers and is not a serious contender in the corporate communications market, the report claimed.

According to EIS, fewer than 50 to 75 Applenets are in operation, and in this market, Apple will be overmatched by such companies as NCR Corp., Hewlett-Packard Co., Wang Laboratories, Inc., Digital Equipment Corp. and above all, IBM.

In the growing business market for microcomputers, compatibility with IBM host processors (and perhaps others such as DEC) will be a critical factor in ensuring success, the report argued.

Apple's newly announced strategy of targeting large organizations also requires a fundamental change in its dealer distribution system, and this will be no easy task, the report contended.

"Most Apple dealers have little interest in, or do not feel capable of marketing to medium and large businesses, particularly the Fortune 1,000 customer. They are not involved in the complexities of compatibility with existing corporate data processing and communications systems, nor are they familiar with selling to corporate DP executives, purchasing departments and others in the corporate hierarchy."

Thus, the report added, a critical problem facing Apple in upgrading its dealer outlets is to prevent the defection of dealers if it sets its requirements too high. "It is at least conceivable that Apple is making a timing error and that it is tightening the reins on its dealers at the time when it should be releasing them to ensure that they remain in the fold," EIS said.

Given these difficulties, EIS predicted that Apple's growth over the next five years will drop to 30% or even lower, compared with a growth rate of 915% in 1978 and 69% this year. This would result in company revenues totaling $3.15 billion in 1988, compared with about $1 billion today.

Despite the host of problems facing the company, the report noted a number of strengths which will contribute to Apple continuing as a viable competitor in the personal computer arena. These include a reputation for product quality, excellent name recognition and an installed base of over one million computer users.

"The Apple Report: A Comprehensive Analysis," costs $650 from EIS, Box 1154, Greenwich, Conn. 06836.

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Honeywell May Reduce Work Force

(Continued from Page 55)
NEC's S-1000 large-scale computer will be integrated with Honeywell's Gcos-8 operating system software in an attempt to meet performance requirements that are higher than those served by Honeywell's DPS 88 distributed processing system.

"Our strategy is to look for third-party relationships which improve the total span of our product offerings, including new software products, and which we cannot meet in a timely fashion through our own internal product development," the executive declared.

As an example of this policy, Manzer also cited a five-year agreement reached this fall with the Swedish telecommunications manufacturer, L M Ericsson Telephone Co., in which the U.S. manufacturer will purchase Ericsson's new MD-110 digital private automated branch exchange for resale in North America. The two companies also formed a jointly owned R&D company, Honeywell/Ericsson Development Co., to develop voice and data communications products.

In conclusion, the Honeywell executive stressed his company will continue as an independent mainframe supplier directing its focus at key areas such as transaction processing and data management facilities and attempting to gain dominance in specific market niches such as manufacturing processes.

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Price Pressures Seen Strapping Printer Makers

FRAMINGHAM, Mass. — Increasing price pressures are forcing printer manufacturers to tighten returns on investment in order to compete in a crowded marketplace, according to a recent report from International Data Corp. (IDC).

The report, titled "Distribution/Pricing Policies: Printer Products," said due to the increased popularity of personal computers in the U.S. in the past five years, the demand for low-end impact printers has dramatically increased. However, it added, the market is currently characterized by severe price pressures resulting from:

- An increased number of new competitors entering the market.
- A reduction in the price of printer components.
- A portfolio of new technologies that simplify the design of the printer.
- The U.S. vendor's adoption of Japanese mass production techniques.

"As a result of increasing price pressures, it is necessary, now more than ever, for manufacturers to analyze closely their return on investment in order to ensure cost effectiveness in every aspect of business," the report stated.

During the past year, IDC said, several vendors discontinued production of many printer models that were not cost effective and replaced them with updated versions instead of merely lowering prices on existing models.

"With advances in technology occurring almost daily and fierce competition in the marketplace, vendors have been forced to discontinue production of any printer that does not utilize the most up-to-date technologies," the report stated.

According to IDC, market pressures have also forced vendors to re-evaluate their channels of distribution. Manufacturers have either decreased their channels of distribution significantly by designating only a few exclusive distributors for their products, or they have sought to increase their channels in an effort to saturate the market with their printers.

Most manufacturers, regardless of which strategy they chose, have maintained a good size OEM base. The OEM business has enabled vendors to maintain a steady demand for their products by packaging a printer with each system the OEM sells, the report noted.

The report predicts that although shipments in the personal computer printer market will continue to grow through 1987, the growth will reach a high point next year for most types of dot matrix and full character printers, slow down during 1985 and 1986 and begin to stabilize during 1987.

During this period, the report added, growth will be greater for the higher speed dot matrix and full character printers than for the under 80 char./sec dot matrix printers, due to the decreasing prices of personal computers through 1987.

Turning to the fortunes of the popular daisywheel printer, IDC said it is now in the middle of a step-down process designed to appeal to the personal computer user market.

Although well on its way, the daisywheel will not become commonplace in this market until the price tag has been reduced to at least $1,500, the report maintained.

For new products with large potential markets, penetration pricing is the most appropriate strategy, the report continued. "This is because the existence of a large potential market is certain to attract large competitors soon after the new technology is introduced."

The intention is to attempt to sell the whole market at one price.

"If the product is only slightly distinctive, the best policy is penetration pricing at a price either at or slightly above those of competitive substitutes," the report stated.

More information on the report is available from IDC at 5 Speen St., Framingham, Mass. 01701.

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Semi Announces Plans For Operation in Japan

TOKYO — The Semiconductor Equipment and Materials Institute (Semi) recently announced plans to establish operations in Japan next year to provide a link between the Japanese semiconductor industry and institute members in the U.S. and Europe.

A Semi spokesman said the institute will seek greater input from Japanese vendors into the development of manufacturing specifications important to both American and Japanese companies. In part, Semi will work in Japan to increase automation of semiconductor processing.

Commenting on the Japanese link, James C. Morgan, president of Semi and of Applied Materials, Inc. of Santa Clara, Calif., said, "Everyone is aware of the major role of Japanese semiconductors in the world marketplace, but until recently most of the capital equipment they used came from U.S. vendors."

Spartacus Tabs Janzen

Carl M. Janzen

BEDFORD, Mass. — Carl M. Janzen, formerly Burroughs Corp. corporate vice-president and before that president of Nixdorf Computer Co., has been named president and chief operating officer for Spartacus Computers, Inc. in Bedford, Mass.

Janzen replaces George McQuilken, one of Spartacus' founders, as president. McQuilken will retain the positions of chairman of the board and chief executive officer.

Janzen began his computer career in sales in 1971 at IBM.

DPMA to Sponsor Seminar On Software Configuration

LOS ANGELES — The Education Foundation of the Data Processing Management Association (DPMA) will sponsor a seminar entitled "Software Configuration Management" in three U.S. cities in January.

The seminar will feature Rick Frederick, manager of software configuration management at Texas Instruments, Inc., who will show participants comprehensive methods for the formulation and implementation of both large and small software configuration management plans. Participants will also learn the tools and techniques necessary to automate configuration management functions.

The seminar will be held in Orlando, Fla., Jan. 23-24; in Boston Jan. 26-27; and in Washington, D.C., Jan. 30-31. DPMA can be reached at Department SCM, Suite 2000, 3420 Kashiwa St., Torrance, Calif. 90510.

Rand Family To Sell Stock To Group

SAN FRANCISCO — A management investment group at Rand Information Systems, Inc. has reached an agreement with family members who control the company for the purchase of 50% of its outstanding stock.

The management group was led by Dale Darnley, president and chief executive officer; Ronald Edwards Jr., senior vice-president treasurer and secretary; and Charles Romig, vice-president. The executives were joined by a group of outside investors.

Additional information concerning the transaction will be disclosed in the forthcoming filings with the U.S. Securities and Exchange Commission. Based here, Rand is a software and service company specializing in software conversions and in the development of advanced business systems.

Rockwell Joins MCC Consortium

AUSTIN, Texas — Microelectronics and Computer Technology Corp. (MCC), a research and development consortium based here, has announced that Rockwell International Corp. has become the 15th member of the organization.

Rockwell is a Pittsburgh, Pa.-based firm which manufactures a variety of products including electronics and automotive items. Rockwell also has heavy involvement in government aerospace projects. It is a major contractor in the National Aeronautics and Space Administration's space shuttle program.

Led by former head of the National Security Agency, retired Adm. Bobby Inman, the MCC consortium is conducting research in four basic areas: semiconductor packaging, software technology, very large-scale integration and computer-aided design and advanced computer architectures.

Other members of MCC include: Advanced Micro Devices, Inc.; Allied Corp.; Control Data Corp.; Digital Equipment Corp.; Harris Corp.; Honeywell, Inc.; Martin Marietta Corp.; Mostek, Inc.; Motorola, Inc.; NCR Corp.; National Semiconductor Corp.; and Sperry Corp.

MCC is located at Suite 200, Echelon Building No. 1, 9430 Research Blvd., Austin, Texas 78759.

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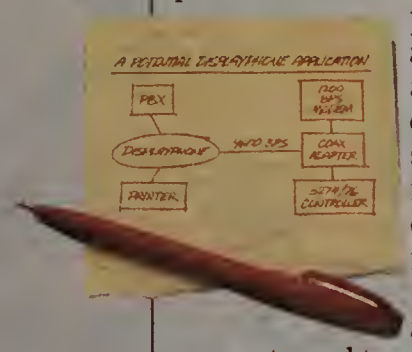

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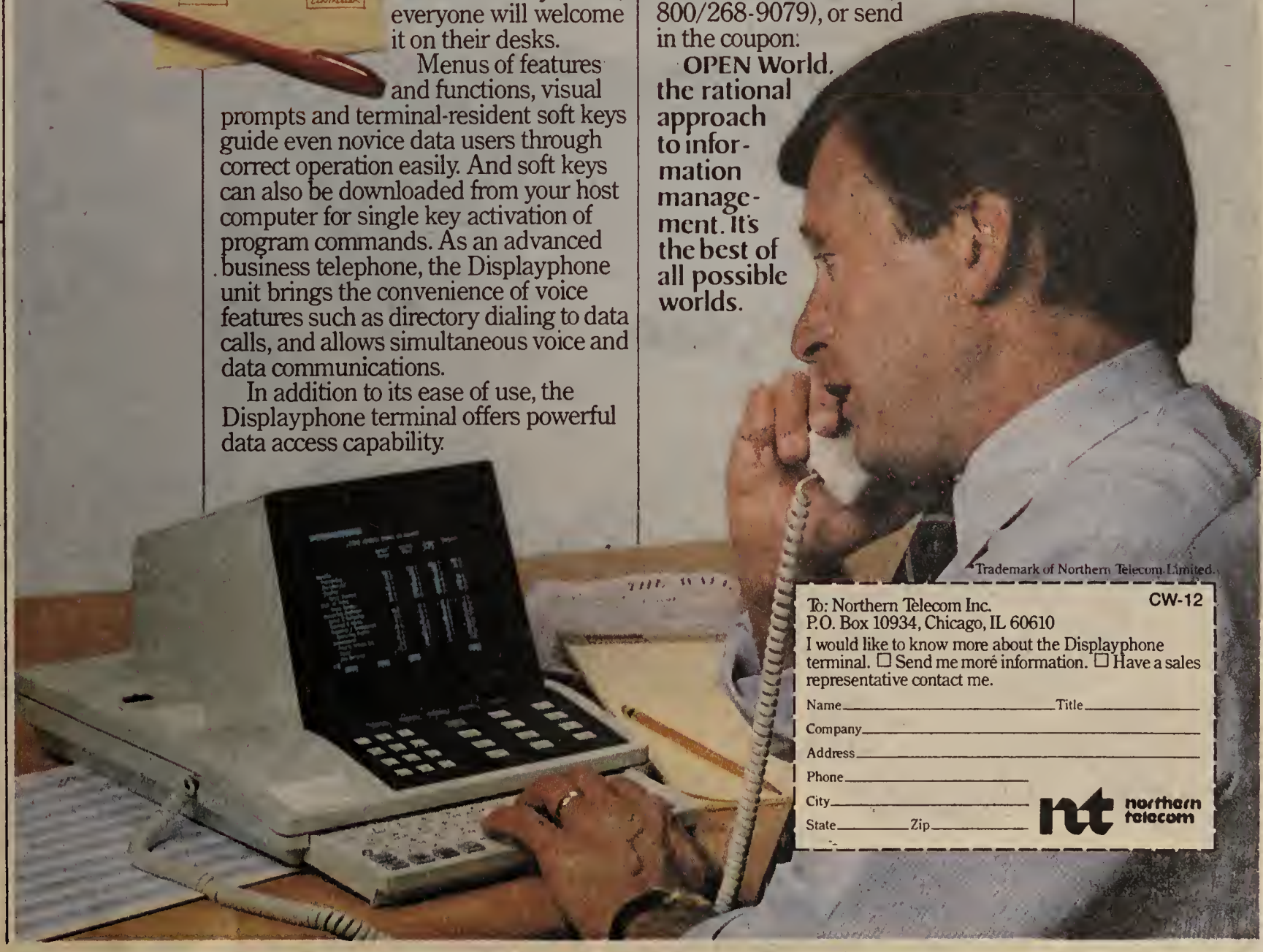

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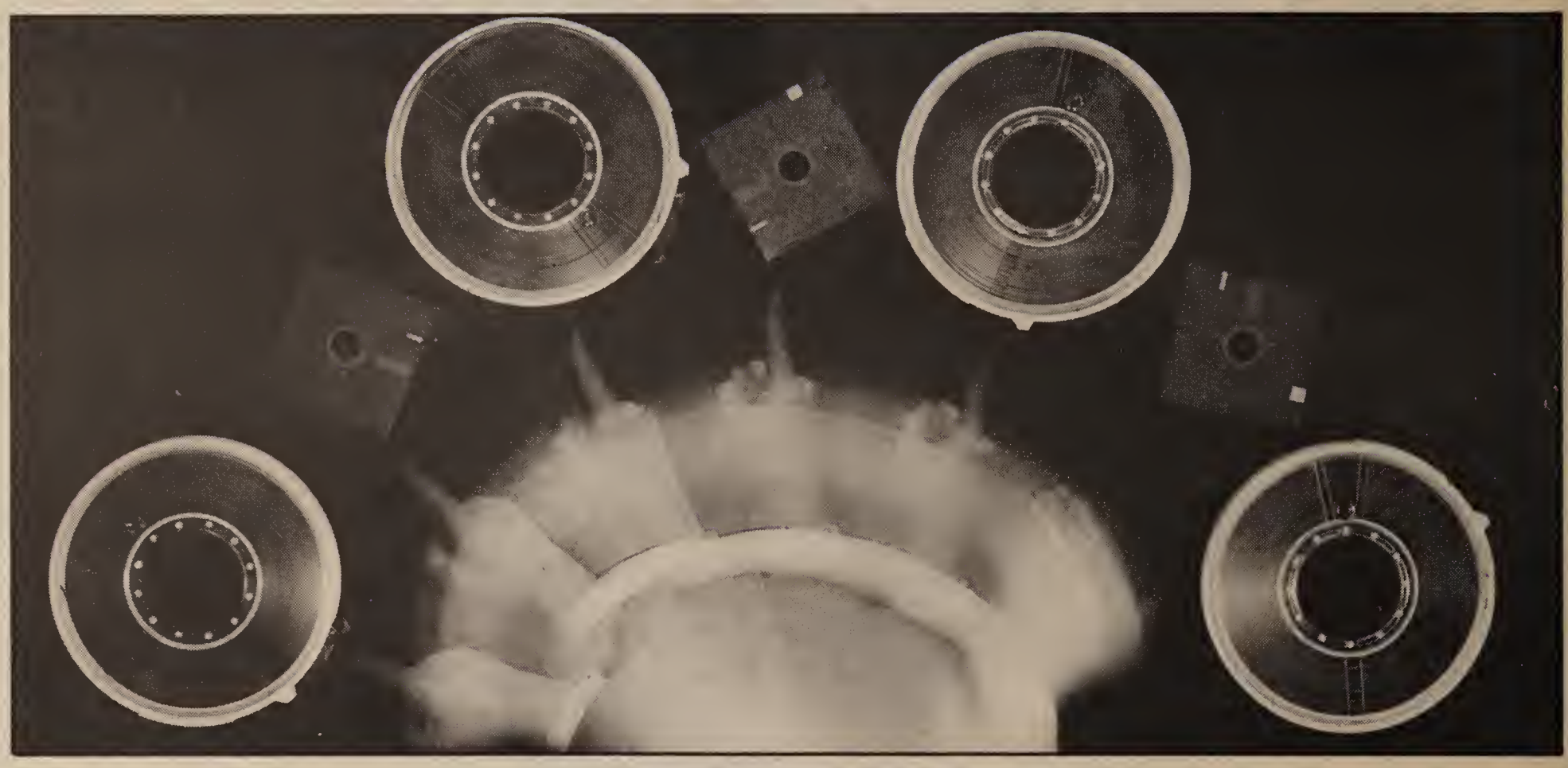

Help is on the way from *Computerworld* this January

The ever-increasing requests for office software; the demand for tools by programmers and users alike; the bewildering array of products to choose from — make the job of selecting applications software challenging and difficult. Here's what you'll get from this January's Special Report on Applications Software to make your job easier:

- The packaged decision: Should you buy, or develop in-house?
- Methods of selecting the best application for your needs.
- Modifying and maintaining packaged applications.
- Integrating applications from multiple vendors.
- Conversion stories.
- Integrating micro with mainframe applications.
- Applications for manufacturing.

You'll get information on who should select packaged applications. You'll read about the impact of application generation tools on selecting packaged solutions. And you'll get pages of fact-filled ads for products to keep you up-to-date on just what's new. If you buy, choose or recommend applications software products — you won't want to miss this special report in *Computerworld's* January 30th issue.

And if you've got packaged software products our readers want to know about — then you need to get your ad to us by January 13 to be included in the Special Report. To reserve space in this issue, call Don Fagan, Vice President Sales/Marketing; Ed Marecki, National Sales Director, or Kathy Doyle, Marketing Support Manager at (617) 879-0700. Or, call one of the sales offices listed below:

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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POSITION ANNOUNCEMENTS

MVS SYSTEMS PROGRAMMER
AUBURN UNIVERSITY

A position is available for a self-motivated professional with experience in IBM operating systems. The individual will be responsible for installing and maintaining compilers and other system software; and designing, developing and documenting local system software. They will also be responsible for coordinating the implementation of system and application support software.

Qualifications Desired: Bachelor's degree required, Master's degree preferred. Two or more years experience in systems programming or equivalent combination of education and experience. Knowledge of MVS internals and maintenance. Knowledge of CICS experience a plus. Must be able to communicate and write clearly and effectively.

Salary to $30K.

Auburn University is a state-supported land grant institution and the largest University in the state of Alabama. The institution is a comprehensive research-oriented University with strong areas of concentration in Agriculturally related services, Natural Sciences, all fields of Engineering and many other disciplines. The University is located in a small urban community of about 60,000 total residents. Located within the area are excellent recreational and social opportunities.

Send a letter of application and a current resume to:

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Director of the Computer Center
Division of University Computing
144 Parker Hall
Auburn University, AL 36849

Application Deadline: February 1, 1984

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BUR NDLII MCP Support	to $45K
DEC VAX Fortran Pgmr - biochem	to $45K
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Large South Florida builder seeks aggressive working manager for their computer department.

Requirements
- NCR VRX operating software experience.
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Opportunity to provide teehnieal support to Wang eommunieations produets including local arca networking (WangNet), voice eommunications produets (DVX), and IBM protoeol cmulation. You'll work by telephone with field pcrsonnel in identifying and rcsolving softwarc relatcd problems, ineluding duplieating reported problems in our Lowell, MA homc office and developing temporary software fixes in IBM and Z80 languagc, as well as providing on-site support to Wang's customer basc worldwide. To qualify, you'll need a minimum of 3-7 years expcrienec within a software support organization with baekground in IBM eommunieation protoeols, including Asyne, Bisyne and SDLC. Knowledge of mieroproeessor assembly language programming or IBM assembly language esscntial; Z80 or 8086 a plus.

VS Software Support Analysts

Challenging role in support of customcr installed software, assisting field support personnel with all Wang produets in resolving software related problems, ineluding troubleshooting, dump analysis, interfacing with R&D software designers and providing teehnieal training. The position requires a minimum of 5 years direetly related experience, or a BS in CS and a minimum of 3 years software support experienee. Knowledge of one or more of the following is required: operating systems, word proeessing software, or teleeommunieations products. Strong eommunieation and analytieal skills and a profieieney in at least two of the following is essential: BASIC, COBOL, PASCAL, FORTRAN, RPG, PL1 or ASSEMBLER.

WP/OIS Software Support Analysts

Thcse profcssionals will provide support of word proccssing software on minieomputer produets as wcll as mieroprocessor-based word proecssing systems. Succcss requires a minimum of 3-7 years experienee in software support with anothcr vendor or large user and a solid understanding of the funetional applications and systems software or eleetronic hardware interfaces. Qualified eandidates will have eurrent expericncc with IBM or cquivalent assembly language and one or more higher level languages, as well as knowledge of systems monitors, I/O traffie, hardware eonfigurations, and word proeessing environmcnts. Baehelor's degree or equivalent.

Diagnostic/Software Engineer

In this key role, you'll assume responsibilities including diagnostie and operating systems support to assist Customer Engineering in resolving or elarifying software related problems. Additional duties will involve serving as a foeal point for various software development groups to ensure that a consistent and highly usable diagnostic strategy is being addressed and maintained, developing Diagnostie Products/Feature releases, and developing and teaching speeialized software eourses. Qualified candidates must possess a minimum of 3-5 years experienee in a field engineering troubleshooting environment, with at least 2 years diagnostic software experience at the assembly language level. Good eommunication skills are essential, and the ability to troubleshoot hardware to the component level is a plus.

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For a telephone interview, eall Jim Taniyama, at 617-685-7122. If you're unable to eall, send your resume with salary history to Wang Laboratories, Ine., Dept. 1219, M/S 8180, 437 South Union St., Lawrenee, MA 01843.

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WANG

The Office Automation Computer People

OPERATING SYSTEMS PROGRAMMERS

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The Trans-Alaska Pipeline, completed in 1977, is symbolic of America's search for energy independence, as well as the emergence of Sohio from being a regional petroleum refiner-marketer into a strong, totally integrated energy corporation. Sohio is one of the nation's largest owners and producers of domestic crude oil from its proven reserves.

Challenging opportunities exist within Sohio's Cleveland Data Center for experienced Operating Systems Professionals who can start making substantial contributions immediately. We need people who can "hit the ground running!"

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- 6-10 years' proven experience in Systems Programming
- Working knowledge and experience in:
  - JES 3 • VM/MVS • VTAM/TCAM

These are the credentials you should have to perform successfully. If you see a fit between your professional qualifications and our needs in these positions, we'd like to hear from you as soon as possible. Attractive salaries, generous benefits and career advancement possibilities complement these key systems opportunities.

Sohio's comprehensive relocation package for new hires includes all normal moving expenses. Homeowners also qualify for mortgage interest differential allowance, third party home purchase and other features typically restricted to internal transfers. There is no better time than **NOW** to JOIN SOHIO. For immediate, confidential consideration, send your resume and current salary history to:

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Degree required. DP professional with 3-5 years programming experience on payroll/personnel systems. Experience should include 1-2 years supervision of data entry clerks. Bi-lingual English/Arabic required. This is a SINGLE STATUS POSITION.

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BS in Computer Science or related field. Minimum of 5 years experience involving DP project planning, scheduling, customer relations and management of computer operations or systems and programming groups. Must be familiar with CPM scheduling methods, project organization, presentation and training techniques. Must have demonstrated ability to work with senior management.

Responsibilities: develop and maintain detailed project schedules including computerized CPM schedules, distribute and explain project plans and schedules to project personnel, brief project manager on project status, and will assist project manager with liaison duties and client relations.

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SYSTEMS PROGRAMMERS

Kansas City Power and Light Company has immediate openings for experienced technical support personnel in a Univac 1100 multi-mainframe environment. These people will provide implementation, maintenance and enhancements of operating system software and hardware, and provide technical assistance to the company's data processing community. Areas of need include 1100 O/S (SYSGENS, DUMP analysis, performance analysis), communications software (micro-mini interfaces, network GENS, CMS/TELCON), data bases (FMS8, MAPPER, DMS 1100), applications support (system utilities and processors, TIP, compilers).

Systems Programmer: Minimum 1 year plus Univac 1100 systems experience.

Sr. Systems Programmer: Minimum 3 years plus Univac 1100 systems experience.

A college degree is desired. Exceptional opportunity for professional growth in rapidly-expanding DP environment. Please send resume and salary; history to:

Catherine R. Hale, Employment Services Dept.
KANSAS CITY POWER & LIGHT COMPANY
P.O. Box 679
Kansas City, Mo. 64141

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Immediate opportunity for proven leader with 8-10 years experience in data communications. Experience must include management responsibilities, design and implementation of networks, performance monitoring and analysis, forecasting and long range planning of data/voice network.

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Qualifications: 3-5 years' experience selling computer software systems; solid understanding of IBM environment and marketplace; DBMS experience desired.

Positions available in the following branch offices: Connecticut; New Jersey; Rochester; Pittsburgh; Washington, DC; Detroit; Houston; Los Angeles.

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Responsibilities: Pre- and post-sale support for **Model 204** DBMS within our Federal Systems Group; pre-sales presentations; analysis of user requirements, benchmarks, customer training and installation.

Qualifications: Solid experience in IBM systems/applications software with emphasis on operating systems, database and teleprocessing.

Positions available in New England; Connecticut; New York City; New Jersey; Washington, DC; Rochester; Pittsburgh; Chicago; Dallas; Los Angeles; San Francisco.

INTERNATIONAL SALES

Responsibilities: Sales and marketing support for **Model 204** international affiliates. Prepare and implement sales and marketing strategies; monitor and report sales progress; coordinate technical consultant support efforts and develop new affiliate relationships.

Qualifications: Minimum 3 years' experience selling systems software in an IBM environment, preferably in the international marketplace.

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Responsibilities: Develop test plans and procedures, create test tools, and assist the Development staff in testing new releases of the world's fastest growing DBMS.

Qualifications: 1+ year software QA knowledge and/or strong IBM operating systems experience needed. DBMS experience a real plus.

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Responsibilities: Complete responsibility for all aspects of customer education including budgetary and personnel concerns; plan, coordinate and control coursework development, materials preparation and distribution and class offerings in CCA Education Centers and at customer sites.

Qualifications: Management, course development and teaching experience; knowledge of instructional techniques and presentation skills; knowledge of IBM mainframe systems and DBMS experience preferred.

Positions available in Cambridge, MA and Denver.

EDUCATIONAL SPECIALISTS

Responsibilities: Conduct **Model 204** education classes in CCA Education Center or on-site customer locations; assist in development of course material; provide hot line and on-site technical support to customers; assist in contract consulting/programming.

Qualifications: Teaching experience; knowledge of IBM systems - JCL; programming languages – COBOL, PL/1, BAL, Fortran. DBMS, CICS, PP, Monitors experience desirable.

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Send your resume, specifying position of interest and geographic preference, to David Levine, Department CW1219-83, Computer Corporation of America, 4 Cambridge Center, Cambridge, MA 02142. Or call (617) 492-8860, Ext. 529.

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CONTINUED STEADY GROWTH

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Dec. 1981 — 148

Dec. 1982 — 227

Nov. 1983 — 316

ASA is growth oriented and aggressive. The graph depicts ASA's steady significant growth.

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SENIOR SYSTEMS PROGRAMMERS

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There are two openings for successful candidates who will be responsible for installing, maintaining, monitoring, and tuning system control program software (MVS/SP and IMS/VS), formulating and documenting operational procedures as well as isolating and resolving system control program problems. Requirements for the openings are:

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- **Good ASSEMBLER programming skills.**
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- **Knowledge of major systems components.**
- **Ability to use dumps in problem program debugging.**
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- **Good communications skills and customer interface.**
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- The ideal candidates will also be familiar with IBM mainframe environments.
- We are seeking sharp individuals who enjoy troubleshooting and possess excellent interpersonal skills.
- These are positions involving customer contact and requiring 75% travel.

SENIOR TECHNICAL ANALYST

- You will be working on an IMS project.
- You must have 4 or more years COBOL and assembler programming experience in an IBM mainframe environment.
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WALKER
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A "Software-Intensive" Effort.

The NS16000 microprocessor is the springboord for on entire family of products currently being developed at National's Microprocessor Systems Division. The key to their success lies in the development of software thot enhances the NS16000 family's performance, applicability, ond elegance. From development through marketing, our "softwore-intensive" effort is rapidly gaining momentum as we develop demond-poged UNIX* systems based on Berkeley 4.1bsd and 4.2bsd for National's NS16032 and NS32032 microprocessors. We are also working with Bell Labs to define o version of SYSTEM V, . . ., etc., for NS16032 ond NS32032. These developments are creoting opportunities for software professionols to join us in the following oreos:

Sr. Software Engineers: Language Tools Development

You will be involved with developing compiler code optimizer, linker, or debugger. Requirements include two to five years' of language tools development experience; including knowledge of "C", Pascal, FORTRAN, ond UNIX.

Sr. Software Engineers: UNIX System Architect

You will be defining o version of SYSTEM V for NS16032 ond NS32032. Two to five years' experience in UNIX kernel development is desired.

Sr. Software Engineers: UNIX Kernel Development

You will work on porting Berkeley 4.2bsd to NS16032 and NS32032 bosed microcomputer systems. Two to five yeors' experience in UNIX kernel development is desired.

Sr. Software Engineers: Networking

You will work with developing/porting networking software under Berkeley 4.2bsd on NS16032 and NS32032 bosed microcomputer systems. Two to five yeors' experience in networking protocol design and development is desired.

Software Engineers: UNIX Utilities Porting and Development

You will be involved with porting and developing UNIX utilities. One to five years' experience in UNIX is desired.

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The elegance ond power of the NS16000 will become evident os more software is developed for it. And those who develop that software will reap the rewords, personolly ond professionally. That's definitely something to think about if you're ready to toke on the challenge of our opportunities.

To leorn more about Nationol's Microprocessor Systems Division, send your resume to Dept. MS, National Semiconductor, P.O. Box 62499, Sunnyvale, CA 94088. We ore an equol opportunity affirmative action employer. Principols only please.

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REAL TIME SYSTEMS ENGINEERS

Ford Motor Company's Research Laboratories have career opportunities for Software Engineers and Programmers to work on projects ranging from the development of real time software for vehicle-on-board-computers controlling experimental engines, active suspensions, new concept displays and instrument clusters to CAD/CAM graphics, sophisticated models and expert systems. Hardware employed ranges from custom microprocessors through 8086/68000 based systems to VAXes and a CYBER 176.

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We are seeking an individual who can generate, maintain and fine tune the Operating System on the IBM Series/1 computer. This person must be capable of providing technical support to our Systems and Programming staff in the areas of COBOL, IAM, MTM and Bisysnc communications. This position will involve a limited amount of travel to our other Divisions to install systems. If you meet the above qualifications please reply in confidence to:

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For immediate consideration call or send your resume to: **Donald C. Quirk,** Lockheed Space Operations Company, 7077 North Atlantic Avenue, Cape Canaveral, Florida, 32920. CALL COLLECT (305) 799-0100. Candidates who wish to pursue opportunities located at Vandenburg Air Force Base, California should send their resume to: Lockheed Space Operations Company, Employment Office, 1100 West Laure Avenue, Lompoc, CA, 93436.

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You will work with users and Systems Analysts to define and design complex changes or additions to existing programs. Qualified candidates will have a Bachelors degree or equivalent and at least 4 years experience in analytical and design assignments. The environment is IBM 3033, OS/MVS, IMS, utilizing COBOL and CICS.

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This management individual will work with executive and middle management formulating project objectives, evaluating priorities, examining alternatives and guiding project plans aimed at the implementation of major business systems. Included is the responsibility for all steps of the phased development of new applications.

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IBM Computer Systems Programmer

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Requires expertise in using structured analysis and design techniques to analyze, design, specify and test state of the art seismic systems for Sohio's aggressive exploration programs.

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Requires expertise in using structured analysis and design techniques to analyze, design, specify and test geophysical data base management systems for use with state of the art seismic interpretation systems.

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SOHIO

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3. human/machine interface, experimental psychology
4. electronic imaging, display technology, 3-D
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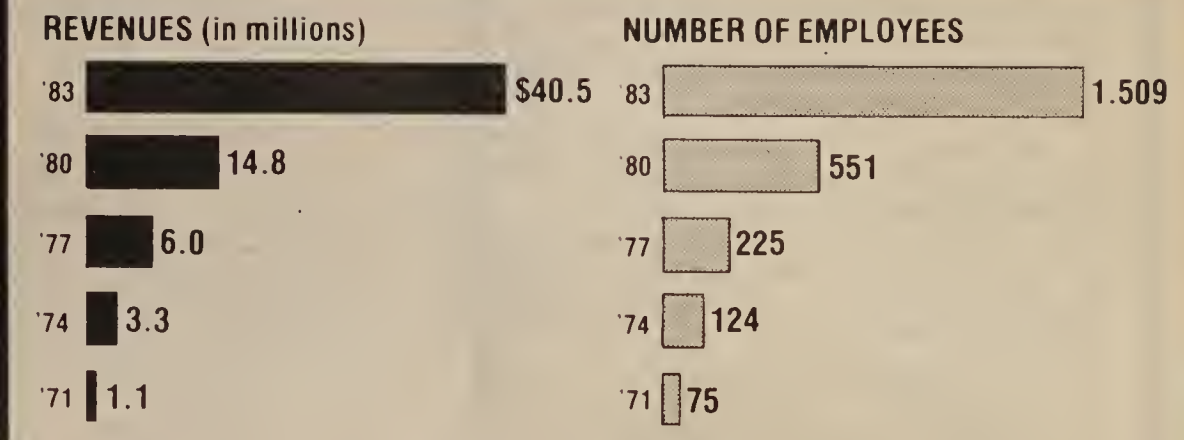

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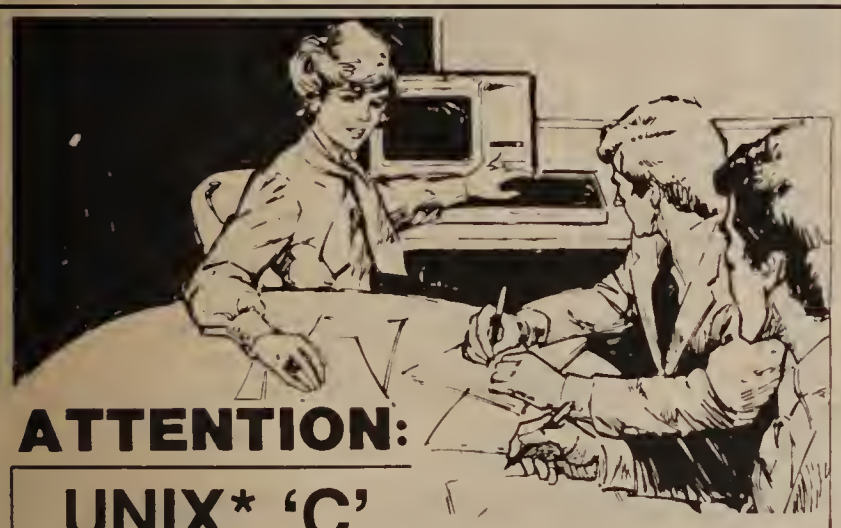

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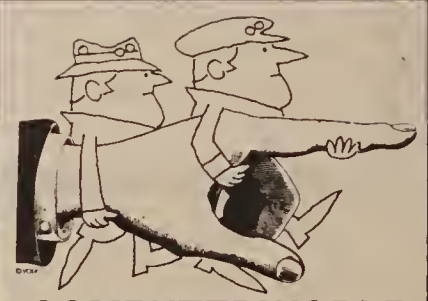

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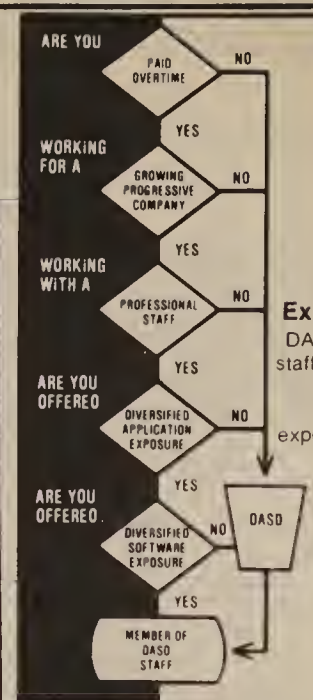

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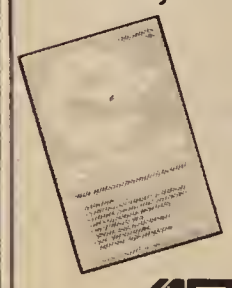

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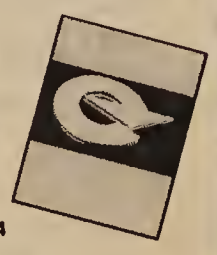

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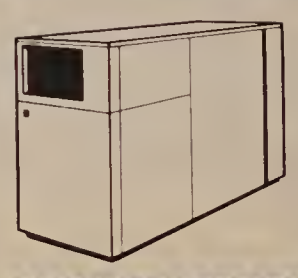

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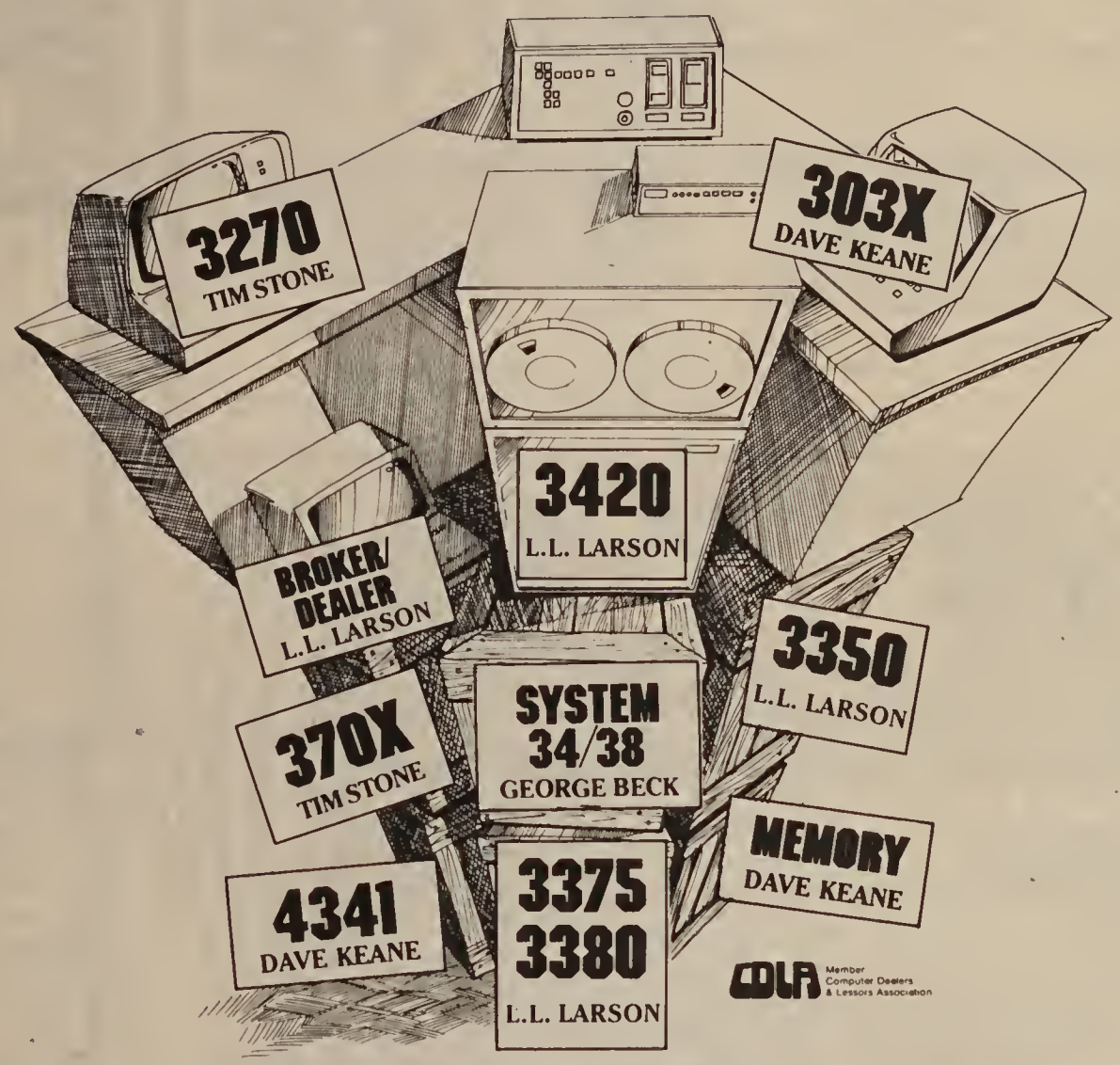

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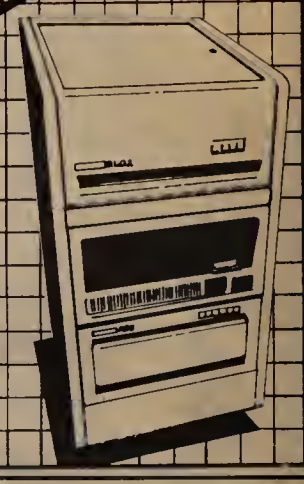

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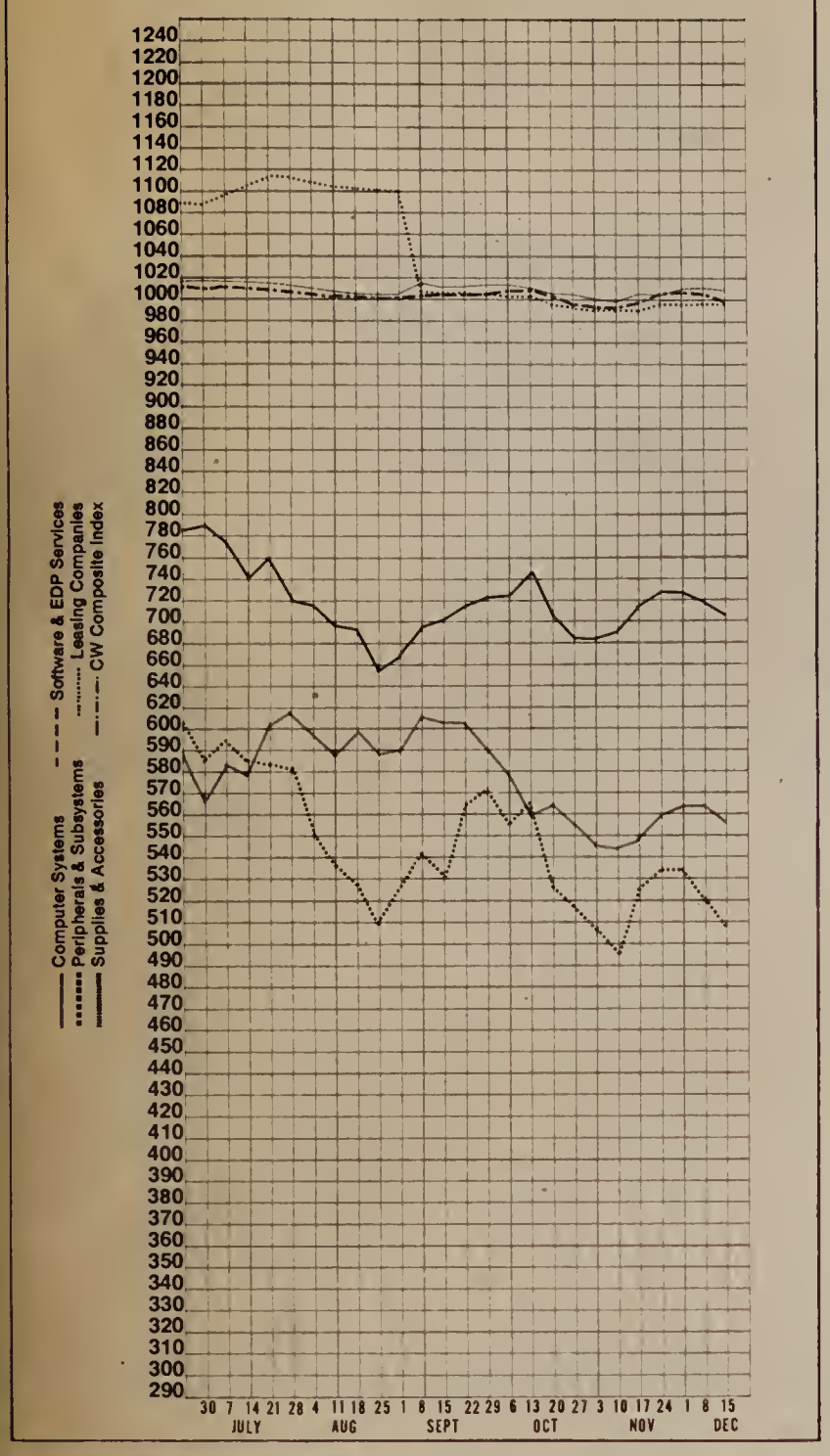

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Computerworld Stock Trading Summary

TRADE*QUOTES

CLOSING PRICES WEDNESDAY, DECEMBER 14, 1983

All statistics compiled, computed and formatted by TRADE QUOTES, INC Cambridge, Mass 02139

EXCH		1982-83 RANGE (1)	CLOSE DEC 14 1983	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
D	ALPHA MICRDSYSTEMS	11- 24	14 3/4	-1 3/4	-10.6
O	ALTOS COMPUTER SYST	8- 28	9 1/2	- 1/4	-2.5
A	AMDAHL CORP	9- 30	19 1/8	+1 7/8	+10.8
D	APPLE COMPUTER INC	18- 63	23 3/8	+2 3/8	+11.3
N	AT&T	60- 70	63 7/8	- 3/8	-0.5
N	BURROUGHS CORP	28- 58	48	+ 1/4	+0.5
O	COMPUTER AUTOMATION	6- 17	6 1/4	- 1/4	-3.8
A	CDMPUTER CONSOLES	8- 26	21 1/8	+ 1/8	+0.5
N	CONTROL DATA CORP	21- 62	44	-1 1/2	-3.2
O	CONVERGENT TECHNOL	18- 41	22 3/8	+ 1/4	+1.1
N	CRAY RESEARCH INC	20- 57	51 7/8	-1 1/8	-2.1
N	DATA GENERAL CORP	10- 41	32 3/4	-1	-2.8
N	DATAPOINT CORP	11- 36	28 1/2	- 3/4	-2.5
N	DIGITAL EQUIPMENT	62-132	69 1/8	-1 1/8	-1.6
A	EECO INC	6- 16	13 1/2	- 3/8	-2.7
N	ELECTRONIC ASSOC.	5- 15	6 7/8	0	0.0
N	FLOATING POINT SYST	16- 44	35 1/2	+1 1/4	+3.6
N	FDXBORO	22- 47	33 3/4	-2	-5.5
O	GENERAL AUTOMATION	3- 16	11 5/8	-1	-7.9
N	GOULD INC	26- 44	30 5/8	- 3/8	-1.2
N	HARRIS CORP	20- 51	39 1/2	- 1/4	-0.6
N	HEWLETT-PACKARD CO	22- 48	40	-1 1/2	-3.6
N	HONEYWELL INC	60-137	134 5/8	-2 3/8	-1.7
N	IBM	57-134	120 7/8	+1 5/8	+1.3
O	IPL SYSTEMS INC	5- 14	5 1/4	- 1/2	-8.6
N	M/A-COM INC	20- 35	20	-1 3/8	-6.4
O	MAGNUSON COMP SYSTS	1- 5	3/8	0	0.0
N	MANAGEMENT ASSIST	7- 19	18 1/2	- 1/8	-0.6
N	MATSUSHITA ELEC(ADR)	47- 80	78 1/4	-1	-1.2
N	MODULAR COMPUTER SYS	6- 16	7 5/8	- 1/8	-1.6
N	MOHAWK DATA SCI	10- 19	15 3/8	+ 3/8	+2.5
N	MOTOROLA INC	82-148	134 1/8	-5 3/4	-4.1
N	NAT'L SEMICONDUCTOR	16- 60	15 3/4	-1 7/8	-10.6
N	NCR	39-136	127 1/4	-6 1/8	-4.5
N	PERKIN-ELMER	17- 37	27 5/8	+ 1/8	+0.4
N	PRIME COMPUTER INC	11- 30	17	+ 1/4	+1.4
N	SPERRY CORP	21- 47	45 3/4	+ 1/8	+0.2
O	TANDEM COMPUTERS INC	14- 40	34 1/8	-1 1/8	-3.1
N	TANDY CORP	34- 65	43	- 3/4	-1.7
O	TELEVIDEO SYSTEMS	14- 41	17 5/8	-1 1/8	-6.0
O	TELXON CORP	9- 16	11 1/2	-1 1/2	-11.5
N	TEXAS INSTRUMENTS	71-176	134 7/8	+1	+0.7
A	ULTIMATE CORP	8- 24	16 1/4	-1	-5.7
O	VECTOR GRAPHICS INC	2- 14	2	- 1/4	-11.1
A	WANG LABS "B"	13- 42	32 3/4	+ 3/4	+2.3
A	WANG LABS "C"	11- 42	32 1/2	+ 1/8	+0.3
N	XEROX CORP	35- 50	50	+1	+2.0
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	11- 35	33 3/4	+ 1/2	+1.5
N	COMDISCO INC	7- 42	19 1/2	- 1/2	-2.5
O	CONTINENTAL INFO SYS	3- 16	9 3/4	0	0.0
N	DPF INC	5- 15	13 5/8	+ 3/8	+2.8
N	U.S. LEASING	18- 47	38 1/4	+ 1/4	+0.6
	COMPONENTS				
N	ADVANCED MICRO DEV	13- 35	32 1/4	-2 1/8	-6.1
O	ADV'D SEMICONDUCTOR	12- 35	33	-1 1/2	-4.3
N	ANALOG DEVICES INC	18- 42	39 3/8	-1 1/8	-2.7
O	ANALOGIC CORP	20- 27	19 3/4	-1 1/4	-5.9
N	APPLIED MAGNETICS CP	19- 37	25 7/8	+ 3/4	+2.9
N	TERADYNE	14- 39	34 5/8	-1 5/8	-4.4

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON; L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

EXCH		1982-83 RANGE (1)	CLOSE DEC 14 1983	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 8	4	+ 3/4	+23.0
D	ADVANCED SYSTEMS INC	6- 22	19 3/4	-1	-4.8
O	AGS COMPUTERS INC	7- 32	26 1/2	-1 1/4	-4.5
D	AMERICAN SOFTWARE	19- 31	19	- 1/2	-2.5
N	ANACOMP INC	6- 23	8	-1 1/8	-12.3
O	ANALYSTS INTL CORP	5- 20	12	+ 1/4	+2.1
A	APPLIED DATA RES.	8- 37	31 1/8	-1	-3.1
O	ASK COMPUTER SYSTEMS	6- 21	16 1/4	-1 1/4	-7.1
B	ASTRADYNE COMP INC	1- 7	2 1/2	0	0.0
N	AUTOMATIC DATA PROC	21- 44	35 1/2	- 7/8	-2.4
O	CGA COMPUTER ASSOC	5- 17	14	- 3/4	-5.0
O	COMPUTER ASSOC INT'L	6- 35	24 1/2	-1 1/4	-4.8
O	COMPUTER HORIZONS	8- 20	12 1/4	+ 1/2	+4.2
O	COMPUTER NETWORK	4- 10	6 3/8	- 1/8	-1.9
N	COMPUTER SCIENCES	11- 23	19 1/4	- 5/8	-3.1
O	COMPUTER TASK GROUP	8- 22	16 1/4	- 3/8	-2.2
O	COMPUTER USAGE	2- 22	13	+2 1/4	+20.9
O	COMPUTONE SYSTEMS	5- 38	6 3/4	- 1/4	-3.5
O	COMSERV CORP	5- 20	5 3/4	- 1/4	-4.1
O	COMSHARE	7- 13	12 1/2	+1 5/8	+14.9
N	CULLINET SOFTWARE	12- 50	41	-1 1/4	-2.9
O	CYCARE SYSTEMS INC	9- 27	16 1/2	-1	-5.7
N	ELECTRONIC DATA SYST	10- 42	35	-1 1/4	-3.4
O	HOGAN SYSTEM INC	19- 53	19	- 1/4	-1.2
N	GENERAL ELECTRIC CO	45- 58	56 1/2	-1 7/8	-3.2
N	GTE CORP	39- 48	42 3/4	-1	-2.2
N	INFORMATICS INC	10- 34	21	-5 1/2	-20.7
O	INFOTRON SYSTEMS COR	25- 43	36 1/4	+ 1/4	+0.6
O	KEANE ASSOCIATES	4- 15	6 1/2	- 1/4	-3.7
A	LOGICON	8- 31	30 1/4	+ 1/8	+0.4
O	MCI COMMUNICATIONS	13- 34	14 7/8	- 3/4	-4.7
O	MNGT SCI AMER INC	8- 33	28	- 3/4	-2.6
O	MATHEMATICAL APP GRP	10- 22	10	- 1/2	-4.7
O	MICOM SYSTEMS INC	25- 50	42 1/2	+1	+2.4
O	MONCHIK-WEBER CP	8- 22	8	- 1/2	-5.8
D	NATIONAL DATA CORP	5- 26	20 7/8	- 1/4	-1.1
O	ON-LINE SOFTWARE INT	17- 27	18 1/2	-2	-9.7
O	PANSOPHIC SYSTEMS	8- 30	20 1/8	- 1/8	-0.6
N	PLANNING RESEARCH	6- 21	17 5/8	0	0.0
O	POLICY MGMT SYSTS CP	15- 35	29 1/2	+ 3/4	+2.6
O	PROGRAMMING & SYS	1- 8	4 3/4	- 3/8	-7.3
O	REYNOLDS & REYNOLD	17- 53	42 3/4	-2	-4.4
O	SEI CORP	11- 34	24 1/2	-1 3/4	-6.6
O	SHARED MEDICAL SYST	13- 43	32 1/2	-1 1/2	-4.4
O	SCIENTIFIC COMPUTERS	6- 14	11 1/4	+ 1/2	+4.6
O	SOFTWARE AG	5- 17	10 5/8	- 5/8	-5.5
N	TYMSHARE INC	12- 30	26 3/8	- 7/8	-3.2
A	URS CORP	5- 18	14 1/2	- 3/8	-2.5
N	WYLY CORP	7- 17	11	- 1/4	-2.2
	PERIPHERALS & SUBSYSTEMS				
P	AM INTERNATIONAL	2- 7	3 3/4	- 1/8	-3.2
A	ANDERSON JACOBSON	9- 26	9 1/2	- 3/4	-7.3
D	AUTO-TROL TECHNOLOGY	8- 29	22 1/8	- 3/8	-1.6
O	BANCTEC INC	7- 33	15 1/4	0	0.0
A	BEEHIVE INT'L	4- 15	8	+1 1/8	+16.3
A	BOLT,BERANEK & NEW	5- 30	24 7/8	- 1/8	-0.5
O	CAMBEX CORP	1- 4	1 1/2	0	0.0
N	CENTRONICS DATA COMP	6- 28	15 1/2	- 7/8	-5.3
A	CETEC CORP	4- 12	10 1/8	0	0.0
O	COGNITRONICS	2- 20	11 1/8	+2 1/8	+23.6

EXCH		1982-83 RANGE (1)	CLOSE DEC 14 1983	WEEK NET CHNGE	WEEK PCT CHNGE
D	COMPUTER DEVICES INC	1- 21	5/8	- 1/8	-16.6
D	COMPUTER TRANSCEIVER	4- 12	3 7/8	0	0.0
N	COMPUTERVISION CORP	19- 53	40 5/8	-2	-4.6
N	CONRAC CORP	16- 38	16 7/8	+ 7/8	+5.4
A	DATAPRODUCTS CORP	16- 41	29 1/2	- 5/8	-2.0
A	DATARAM CORP	5- 12	10	- 1/4	-2.4
O	DATA SWITCH CORP	13- 41	26 1/2	-2 1/2	-8.6
O	DATUM INC	2- 17	8 1/8	- 5/8	-7.1
O	DECISION DATA COMPUT	3- 16	10 5/8	- 7/8	-7.6
O	DOCUTEL-OLIVETTI	11- 39	11 3/8	- 3/4	-6.1
N	ELECTRONIC M & M	5- 11	7 7/8	- 1/4	-3.0
O	ENDATA, INC	11- 16	10 3/4	- 3/4	-6.5
O	EVANS & SUTHERLAND	18- 50	31 3/4	- 3/4	-2.3
O	GANDALF TECHNOLOGIES	9- 22	9 3/8	- 1/8	-1.3
N	GEN'L DATA COMM IND	6- 32	32	+ 1/2	+1.5
O	GREAT SOUTHWEST IND	1- 6	1	0	0.0
N	HAZELTINE CORP	7- 31	25 3/8	0	0.0
O	ICOT CORP	3- 10	3 3/8	- 1/2	-12.9
O	INFORMATION INTL INC	10- 22	13 1/4	0	0.0
O	INFORMATION SCIENCE	12- 17	15	0	0.0
O	INTEL CORP	11- 45	40 1/4	-1 1/8	-2.7
O	IPL SYSTEMS INC	5- 14	5 1/4	- 1/2	-8.6
A	LUNDY ELECTRONICS	7- 19	11 3/8	- 3/4	-6.1
O	MEGADATA CORP	9- 15	13	- 1/4	-1.8
A	MSI DATA CORP	16- 37	19 3/8	-1 3/8	-6.6
N	NASHUA CORP	9- 29	23 3/4	+ 1/2	+2.1
O	NETWORK SYSTEMS CORP	8- 34	18 7/8	-2 7/8	-13.2
N	NO AMERICAN PHILIPS	47- 79	75 7/8	+ 3/4	+0.9
N	NORTHERN TELECOM LTD	22- 49	40 1/4	-2 5/8	-6.1
O	OMEX	3- 6	3 1/2	- 1/4	-6.6
N	PARADYNE CORP	14- 30	19	+ 1/8	+0.6
A	PENRIL CORP	7- 14	12	- 1/8	-1.0
O	PHOENIX AMERICAN INC	7- 17	12 1/4	+ 1/4	+2.0
N	PLESSEY CO (ADR)	26- 41	31 3/4	+ 1/8	+0.3
O	PRINTRONIX INC	23- 34	26 1/2	-2 1/4	-7.8
O	RAMTEK CORP	9- 26	12	- 3/4	-5.8
N	RAYTHEON CO	42- 58	44 3/8	+ 1/2	+1.1
N	RECOGNITION EQUIP	4- 17	12 1/8	- 3/4	-5.8
N	ROLM CORP	40- 80	52	-1 7/8	-3.4
N	SANDERS ASSOCIATES	50-120	49 5/8	-2 1/4	-4.3
O	SCAN DATA	1- 3	5/8	0	0.0
O	SCAN-TRON CORP	12- 17	16 1/4	- 1/2	-2.9
N	SCIENTIFIC ATLANTA	15- 23	15 3/8	- 5/8	-3.9
N	STORAGE TECHNOLOGY	14- 33	14 1/8	- 5/8	-4.2
O	SYKES DATATRONICS	4- 27	4 1/4	- 1/8	-2.8
O	SYSTEMS & COMP TECH	26- 39	28 3/8	- 7/8	-2.9
A	T BAR INC	7- 17	9 1/4	- 1/2	-5.1
A	TAB PRODUCTS CO	8- 30	23 7/8	+1	+4.3
O	TANDON CORP	19- 35	19 1/2	+ 1/4	+1.2
A	TEC INC	6- 12	7 1/2	+1 1/4	+20.0
N	TEKTRONIX INC	34- 87	73 5/8	-1 3/4	-2.3
N	TELEX	5- 32	22 7/8	- 3/8	-1.6
O	TESDATA SYSTEMS CP	3- 17	9 1/2	-1	-9.5
N	TIMEPLEX INC	7- 29	24	-1 1/4	-4.9
O	VISUAL TECHNOLOGY	9- 26	19 1/4	-1 1/4	-6.0
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS FRODS	11- 34	33 5/8	+ 7/8	+2.6
N	BARRY WRIGHT	13- 33	31 3/4	+ 1/4	+0.7
A	DUPLEX PRODUCTS INC	12- 28	25	- 1/2	-1.9
N	ENNIS BUS. FORMS	6- 28	24	- 1/2	-2.0
N	3M COMPANY	49- 90	85	- 5/8	-0.7
N	MOORE CORP LTD	26- 51	43 1/4	- 3/4	-1.7
O	STANDARD REGISTER	11- 34	31	-1 1/4	-3.8
N	WALLACE BUS FORMS	11- 33	31 1/4	- 1/2	-1.5

Their way.

1. Specify Data Element
2. Define Database
3. Create Screen Formats
4. Develop Applications to
   A. Populate
   B. Modify
   C. Delete
   D. Retrieve
5. Link Definition, Screen and Application Together
6. Document The System

Our way.

1. Specify Data Element

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